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THE ACTION STARTS ON PAGE 33

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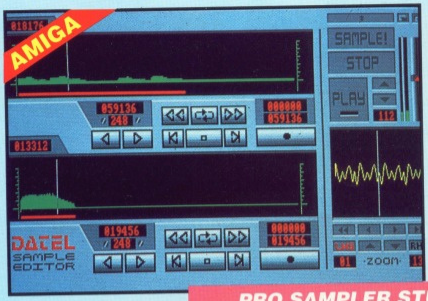

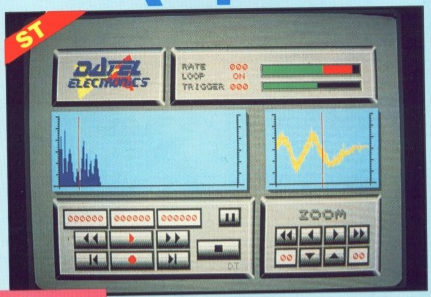

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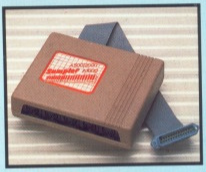

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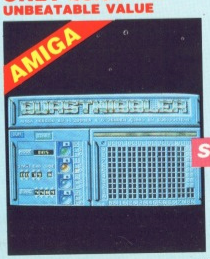

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VIDEO DIGITISING.....23

SILICON SEDUCTION....61

PICK A STICK.....94

SPECTRE 128.....98

CHIPS ALIVE!....12

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REGULARS

NEWS 7

GOLD DUST.....19

PD UPDATE.....26

DESKTOP 100

WORKBENCH.....105

LETTERS.....114

DESERT ISLAND DISKS.....122

CAD II 29

The best CAD packages for your machine.

SPECIALS

FUTURE PROCESSING 12

ASSEMBLER TUTORIAL.....47

JOYSTICK SURVEY 94

SPECTRE 128 98

DISK EXTRA 33

ST

Flair Paint – useable demo of the best ever ST art package; *Zap ST* – powerful file editor; *Sprite ST* – tool for creating animated sprites; *Typist* – touch-typing tutor for you to tinker with; *TrackIt* – discover exactly what your disk drive's read head gets up to.

AMIGA

Colossus Chess – playable demo of CDS' chess game; *VirusX V3.1* – protects disks against viral infection; *Task Control* – keep multitasking programs under your thumb; *Boot Intro* – add scrolling messages to your disks; *Tunnel* – psychedelic mayhem.

Create your fantasies with ST *Flair Paint*.

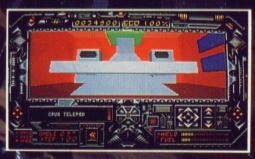
DANCE WITH A STRANGER.....42

You're not restricted solely to traditional keyboard synthesisers. There's a wealth of MIDI instrumentalia that can be attached to your computer: drum kits, digital horns, microphones, guitars and much more. Your indispensible guide to the more exotic musical instruments plus the software needed to use them.

GAMES

Screen Play..... 71
Battle Hawks.....76
Millenium..... 78
Voyager..... 82
Thunderbirds..... 84
Bio Chalenge..... 87
Game Busters.....91

LORDS OF THE RISING SUN.....74



DARKSIDE.....88

ART & NOISE

VIDEO
DIGITISING 23
MIDI
INSTRUMENTS 42
ICON PAINT 52
ANIMATION
TUTORIAL.....57

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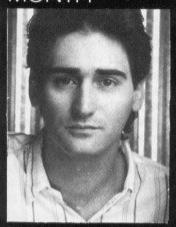


Pixel titillation seems to be the theme this month – and why not? The feature starting on page 61 raises some thought-provoking questions though. For instance, should sex games – *Hollywood Poker Pro, Leather Goddesses of Phobos, Teenage Queen, Emmanuelle, Leisure Suit Larry, et al* – be available to under 18s? Some sort of certification akin to the film industry's system is definitely needed.

I'm not a prude – far from it. In fact, I quite enjoy saucy software. The *Leisure Suit Larry* series include some of the funniest – albeit risqué – scenes of any software. As for strip poker games – well, everyone is allowed to indulge from time to time. However, I can sympathise with parents' points of view. Little Johnny should be shielded as much as possible from the coarse world during his formative years. But there's little chance of that with such lax regulations. Something must be done!

Assuming 'over 18' stickers become all the rage, retail outlets will presumably need to dust down their top shelves to make way for the smut. Now that would be interesting!

Hardcore demos, available from several PD libraries dotted round the country, are another thing all together. The animated variety usually break the Video Recordings Act. How long will it be before someone decides enough is enough?

That's enough of my thoughts on the matter; what are yours? You know the address, so get writing!

US GOLD HERALD GAMES PRICE WAR

US Gold have announced that they are dropping the price of all their coin-op licences to £14.95. *Forgotten Worlds* is the only remaining licence to be pitched at the old £19.95 price level. US Gold's PR executive, Danielle Woodyatt, stated: "This does not apply to games programmed outside this country, but hopefully even that will change."

Other major software houses appear reluctant to follow this lead, but a host of budget labels have made an appearance over the last few months. Software Horizons have been the latest to announce a budget label, going under the title of Rapid Software. Games will sell for £9.95 – the same price as those stepping out of the Jeff Minter stable (*Andes Attack* and *Super Grid Runner*, for instance).

■ *Format* hopes to spearhead a campaign to bring down the prices in games software. We would welcome your views and comments on current prices in the games scene to pass on to the software houses. Send your views to *PRICE BUSTERS, ST Amiga Format, 4 Queen Street, Bath BA1 1EJ.*

Virgin Mastertronic have a number of products lined up for release on their budget label including *Risk* and *Monopoly Deluxe*. Their original budget price was £9.95, but Andrew Wright, product manager, is currently discussing price points as Virgin Mastertronic aren't getting the volume sales they want at £9.95.

US Gold are currently in the process of setting up their own budget label, announced at a recent promotional bash in London. This label, entitled Klassix, will be the start of a campaign to re-release US Gold classic hits such as *Outrun* and *Leaderboard* at £9.95. Danielle Woodyatt commented: "We hope other software houses will follow our lead and reduce their prices." As yet other software houses' reactions have been tentative. Grandslam's Duncan Lowthian summed up the situation: "We appreciate that cheaper games are the way forward, but we are reluctant to make any moves in that direction at the moment".

Everyone is waiting to see the outcome of US Gold's brave attempt.

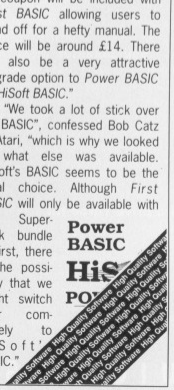
HiSoft BASIC to be given away with ST

After last month's news story that Atari are to introduce a new ST bundle later in the year, HiSoft have confirmed that a cut-down version of their popular version of the BASIC programming language is to be included in the deal. The 520STFM Superpack also comprises 20 games – *Xenon, Double Dragon, Nebulus, Eliminator, Outrun, Gauntlet II, Super Huey, Afterburner, R-Type, Predator, Super Hang-On, Black Lamp, Starglider, Space Harrier, Bomb Jack, Overlander, Pacmania, StarGoose, Star Ray,* and *Bombuzal*, as well as *Music Maker* (which is of the same ilk as *Music Construction Kit*) and Organiser software.

First BASIC, as HiSoft's cut-down BASIC is to be called, is to be modeled on *Power BASIC*. The major differences will be a lack of a compile-to-disk option and fewer libraries. *First BASIC* will work just like an interpreted language even though it compiles to memory. Virtually all ST BASIC programs should run under *First BASIC* – albeit much faster – without modification.

HiSoft's MD, David Link, said "a coupon will be included with *First BASIC* allowing users to send off for a hefty manual. The price will be around £14. There will also be a very attractive upgrade option to *Power BASIC* or *HiSoft BASIC*."

"We took a lot of stick over ST BASIC", confessed Bob Catz at Atari, "which is why we looked at what else was available. HiSoft's BASIC seems to be the ideal choice. Although *First BASIC* will only be available with the Superpack bundle at first, there is the possibility that we might switch over completely to HiSoft's BASIC."



QUICKIES

■ ST hard disk backup problems have been solved with the introduction of **FA-ST Tape Backup** from Third Coast (0257 426464). It's a tape streamer that comes in either a stand-alone unit or fitted in the same box as one of Third Coast's hard drives. It's compatible with the Cumana, Third Coast, SH204, Megafile and Supra ranges of hard drives. A DMA-out for hard drives which lack such a socket is included. Data cassettes of various capacity are available: 45Mb (£649), 65Mb (£749) and 155Mb (£873). TOS, MS-DOS, *Spectre 128* and *Magic Sac* partitions are all possible on the drives.

■ Amiga 1000 owners can now upgrade to Amiga B2000 models by trading in their old machine. The new-for-old offer comes from **Panther Peripherals** at Rowlandson House, 289-293 Ballards Lane, Finchley, London, N12 8NP (01-446 8431). Panther will accept any A1000 in part exchange for the latest Amiga model from anywhere in the UK or overseas. The deal involves users sending their computer along with payment of £699 to Panther. In return they'll receive a B2000 with Kickstart and Workbench 1.3.

■ The **Fontkit Plus Accessory Pack**, which lets you grab characters or images on screen and convert them to GEM-font format, has been released by the ST Club. It costs £4.95 (£3.95 to registered *Fontkit Plus* users). Also from the ST Club is the *Fontpac Series* – a set of fonts on disk. Each disk costs £2.70. Details from 9 Sutton Place, 49 Stoney Street, Nottingham NG1 1LX (0602 410241).

■ Amiga owners can output sound in superb stereo thanks to Siren Software's **Soundblaster**. The kit comes with two 20-Watt 3-way speakers and a mini amplifier which gets its power from the Amiga. Free headphones are being given away with the package. *Soundblaster* costs £39.99 and is available from 84-86 Princess Street, Manchester M1 6NG (061-228 1831).

■ **Hard Drive Turbo Kit** from Microdeal provides ST hard drive users with a set of handy utilities for optimising seek speeds, providing a file cache and, that old chore, backing up data onto floppy. Price is £29.95. Further details from PO Box 68 St Austell, Cornwall PL25 4YB (0726 68020).

QUICKIES

HARD TIMES COMING

Suddenly everyone is releasing comparatively low-cost hard disk drives or reducing prices of existing models. This is no bad thing, and is well overdue. Originally manufacturers blamed low sales and expensive components on high retails prices. It seems those days are over. Andrew Bennett, Frontier's managing director, voiced the opinion of many: "Market forces, volume sales and better deals from parts manufacturers means prices are tumbling". This also explains Frontier's £100 reduction on their 30Mb Supra ST hard drive.

£300 HARD DISKS OPEN UP MARKET

CST of Swindon, Wiltshire, have come up with a 20Mb drive for the ST for £299. Although the drive doesn't have a real-time clock or auto-booting facilities, its price is remarkable. The next model up, the 40Mb drive, goes for £399. Provision for auto-booting is expected later in the month. Upgrading should cost around £30. According to Martin Dolney of CST an Amiga A500 version of their hard drive system will be available at the Commodore show. No firm retail price yet, but Martin hopes for a price of £399. The Amiga drive is more expensive than its ST cousin because it features an SCSI interface, auto boot, DMA port and space for installing 2Mb of RAM.

Applied Systems and Peripherals (ASAP) of Scunthorpe, famed for the budget genlock device Minigen, have finished work on an Amiga hard drive for under £400. The 40Mb Amdrive is available in two models – an external A500 version with power supply and fan, and an internal A2000 version.

Currently only the A2000 model offers auto-booting with Kickstart 1.3. Chris Hargreaves at ASAP hopes to have an auto-booting A500 model ready in a few months time. A500 users will be able to trade in the existing version of the hard drive for the new model. Price for the upgrade hasn't been finalised, but is expected to be between £40 and £50. Auto-booting is only possible with the Kickstart 1.3 ROMs – ASAP will replace the A500 ROMs and upgrade the drive for around £75.

Amdrive's £399 price is extraordinary when compared to Commodore's A590 hard drive system for the A500 (no official price yet, however, sources at Commodore reckon it will come in at between £500 and £600) and the A2090 hard drive for A2000s (£574). Both of Commodore's drives offer 20Mb storage and auto-booting.

■ **Frontier, PO Box 113, Harrogate, North Yorkshire, HG2 0BE (0423 530577).**
■ **CST, The Shaftesbury Centre, Percy Street, Swindon, Wiltshire (0793 481333).**
■ **ASAP, Queensway Business Centre, Brigg Rd, Scunthorpe, DN16 3RT (0724 281317).**

TOP ATARI MAN JOINS GFA

Les Player, Atari's technical manager, has been appointed to head GFA System Technik's operation in the UK. Les had been instrumental in ensuring the development of the Atari transputer and Pocket PC went gone smoothly.

His first role at GFA will be to release *GFA BASIC V3.03* and *GFA Compiler* for the ST. Looking further ahead, there's *GFA Compiler* for the Amiga due soon.

SIGNALS FROM SPACE

It's now possible to receive free weather satellite pictures beamed down from space using the latest Amiga teletext adapter from Microtext. The pictures originate from orbiters like Meteosat which circle high above the equator. The Met Office's computers capture the signal and process the picture to make the view appear to be of overhead Britain. As well as being able to receive satellite pictures and telesoftware, the Microtext adapter enables normal teletext to be displayed on the Amiga's screen. The adapter even enables the 1081, 1084 and 8833 monitors to pick up TV stations. The Microtext Teletext Adapter costs £143.52 and is available from 7 Birdlip Close, Horndean, Portsmouth (0705 595694).

LIGHT BRIGADE ARRIVES

Third Coast, renowned for their range of budget hard drives, have managed to hook a Sony read/write optical drive to an ST. The drive uses 12-inch CDV-like disks capable of 900Mb of storage. According to Jason Miller at Third Coast access time is very fast – somewhere in the region of 10ms.

While having all that storage space sounds ideal, the price (£4,950) means that only large companies will be able to afford the device. One use for the drive would be as a file server in a network – it would have to be a large network to justify the expense though.

Also from Third Coast is a Bernouli drive for around £799. This uses removable 44Mb disks which cost £120 each. The Bernouli drive has a 40ms access time which is on a par with fast hard drives.

■ **Third Coast, Unit 8, Bradley Hall Trading Estate, Standish, Wigan, WN6 0XQ (0257 426464).**

AMIGA HELPS AT LOCKERBIE

Dumfries and Galloway police have installed an Amiga 2000 computer system to help process the many hundreds of hours of videotape taken during the aftermath of the Lockerbie air disaster.

The Amiga system is being used to reconstruct the site of the crash so that police can work out what happened prior to the incident. The system will allow experts to produce stills from video material via a digital framestore. The graphics capabilities of the Amiga are being used to enhance the finished pictures before they are sent to a Polaroid freeze-frame film recorder.

Said Bob Ovens of the Dumfries and Galloway police force: "The Amiga 2000 system obviously gives us the potential for crime detection by using its excellent graphics and the ability to grab video images – so we can output them as photographs and slides."

To help with the analysis of other disasters, the A2000 system is being used to produce overhead transparencies for demonstration purposes, as a video titler, and to make animations of incidents.

Blunders from last month

Archipelagos Demo – It works, but not all the time. Keep resetting the machine until the game responds.

DIY Sound Sampler – In Figure 1 pins 7 and 8 of the ADC (IC2) should be connected. Also, the parts list failed to mention the type of diode necessary. Two general-purpose signal diodes, 1N4148, will do.

Norfolk-based Graphix are offering a digitising service using their custom-built real-time frame grabber. You send them the photographs, slides or videos with the images on them and Graphix will transfer them to disk. Graphix will consider travelling to you and videoing any objects that are too large to post. Each shot costs £1 – except for the first which costs £1.50. A quality print out, like the one on the right, is available at extra cost. Graphix's grabbing hardware, which includes a simple genlock device, is available for £535. Details from 141 London Street, Swaffham, Norfolk, PE37 7DW (0760 24947).

GET THE PICTURES

Commodore and Atari shows set for June with launches galore in store

SHOW OFFS

Software and hardware manufacturers are promising major launches at next month's Atari and Commodore shows.

The Commodore show takes place from Friday June 2 to Sunday June 4; the venue is the Novotel Exhibition Complex in Hammersmith, London.

Companies known to be attending the Commodore exhibition include HiSoft, who plan to have the developer version of *Devpac*, an Extend library for their BASIC and something new on the C front; George Thompson Services will be there with their range of RAM expansions and external drives; Power Computing are to demonstrate *Video Magic* and several hard drives; Arnor will have the latest version of *Protext*; and Hi Tension hope to have a £350 2Mb internal RAM expansion and *VAT Master Professional*.

There will be over 100 exhibitors attending the show which will feature presentations, advice stands and special events.

You can order tickets – £4 for adults and £2.50 for under 16s – on 051-3572960 and make a saving of £1 on the door price. Show times are from 10am to 6pm except for Sunday when the show closes at 4pm.

ATARI AT ALLY PALLY

The Atari show is later in the month – being held at Alexandra Palace in Wood Green, London – from Friday 23rd to Sunday 25th. Tickets are available on 051-3572961 and cost the same as the Commodore show.

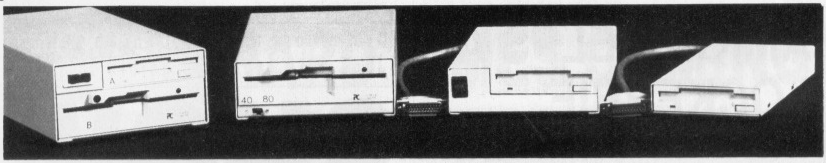
Don't forget that the *STOS* Games Writer of the Year competition will be judged at the Atari show. You've still got time to send your games to Mandarin Software, Europa House, Adlington Park, Adlington, Macclesfield, SK10 4NP. First prize is having your game marketed by Mandarin and £5,000 in advance royalties. Mandarin have already selected four games that they consider to be the best so far. These are *Sky Strike*, *Battle Command*, *Mouth Trap* and *Arthur of the Britons*.

BIG PRIZES

Three fabulous holidays – worth £3,000 in total – have been put up by SDL and Database for the most innovative use of the ST. Winners to be announced at the show.

First prize, £1500 from SDL in the form of Premiere Cheques (which can be cashed in for a luxury Mediterranean cruise) plus the cash equivalent from Database allowing the winner to take another person. Second prize is £1000 in cheques plus the cash equivalent for a second person. Third prize is £500 in cheques plus the cash equivalent for another. Sounds confusing – but basically the three winners get prizes allowing them to take themselves and a partner on an exotic holiday.

All you need to do to enter is write a 500-word description of the innovative way you use the ST and send the brief – along with any support material on disk – to *ST Amiga Format*, 4 Queen Street, Bath, BA1 1EJ. The innovative use could fall into any category; anything from the boffin who has achieved a major breakthrough using the computer to the housewife who plans gourmet meals on the ST.



TRADE SECRETS

The European Computer Trade Show, held last month in Islington, was the launch pad for various new ST and Amiga products. RICHARD MONTEIRO reports.

Leading computer traders from all over Europe tuned up in Islington on a windy April day to show off their wares to the assembled computer dealers, importers and the occasional journalist at the European Computer Trade Show. Some interesting Amiga and ST products came to light during the course of the show.

Power Computing displayed an enviable number of new items including a wealth of hard drives. Offered in 20, 40, 80 and 100Mb versions for both machines, the ST drives start at £459 while the cheapest Amiga model is £574. The Amiga version costs extra as it has room inside the case for an optional 2Mb RAM board. An A2000 version is available with extra memory.

The performance of the A2000 can be boosted to that of a workstation with Power Computing's 68030 accelerator card, *Impact*. Two models are available – one running at 16MHz and the other at 25MHz. Up to 8Mb of high speed, 32-bit, RAM can be added via an optional daughterboard. Software and hardware selection of 68000 or 68030 is possible. There's a socket for an optional 68881 or 68882 floating point co-processor. *Impact* cards start at £699.

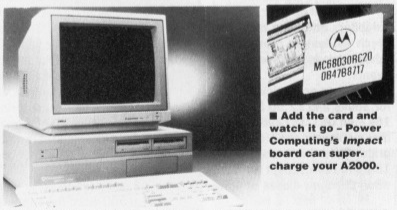
PC emulation on the ST wil take a leap forward with Power Computing's announcement that they are to distribute Avante Garde's *PC Ditto II*. The update is a £199 hardware/software combination that boasts a Norton SI rating – the industry accepted PC speed rating – of 3. This compares favourably to the bottom of the range IBM PC XT's rating of 1, the new but slow IBM PS/2 Model 30's 1.8, and the Zenith EZ-20's 2.6. Full use of the ST's i/o ports can be made, the mouse can be used, and either mono or colour screens are supported. Only eight-colour low-resolution CGA graphics can be used in colour – high-res EGA compatibility is planned later in the year. Only 640K of the ST's memory can be used for running programs – even with machines containing more than 1Mb. This is a fault of MS-DOS. Power Computing are on 0234 273000.

Arnor previewed *Protext V4.20* for both the ST and the Amiga. Additions include a completely revised and reorganised manual, date and time insertion direct into a document, a mouse-positionable cursor, a better procedure for installing printer drivers, a faster CONVERT program, provision for accessing Greek characters, scroll lock and status bar clock. "Big changes", said Arnor's Mark Tilly, "will only appear in V4.30." *Protext V4.2* retails at £99.95. Upgrading from V3.5x costs £30, upgrading from V3.6x costs £20 and upgrading from V4.1x and V4.0x costs £15. More from Arnor on 0733 68909.

HiSoft are now distributing *Tempus 2* – the follow on to the speedy text editor *Tempus* – for £39.95. *Tempus 2* is faster, includes facilities for editing up to four files simultaneously, three cursor modes, powerful search and replace functions, text conversion utilities, keyboard shortcuts, undoable undo and auto file save.

Also new from HiSoft is the £49.95 *C Interpreter*. It's a package designed to take the hard work out of learning to program C. Rather than having to go through the tedium of compiling your program, you can run it in situ. It's ideal for beginners.

Although Telecomsoft were in turmoil due to being taken over by Microprose, they made an appearance at the show. The follow up to *Bubble Bobble*, *Rainbow Islands*, looks as addictive as the original. Also to look forward to are *Quartz*, *Savage*, *Weird Dreams* and *Verminator*.



■ Add the card and watch it go – Power Computing's *Impact* board can supercharge your A2000.

■ Along with other hardware add-ons, Power Computing launched a selection of floppy drives, some of which are pictured above. For flashing-lights fanatics there's the Triangle Elite disk drive which features an on/off switch and track counter. The ST model is priced at £129.95 while the Amiga version goes for £119. The price difference is attributed to the fact the ST version comes with a power supply (Amiga drives take power from the computer). For the Amiga there's also the Multi-Drive which consists of both 5.25-inch and 3.5-inch drives. It weighs in at £249.

■ *Photon Paint II* – the Amiga HAM art package – was demonstrated at the Trade show, but not on the Activision stand as expected. Instead Microillusions, creators of *Photon Paint*, showed off the software's capabilities. Microillusions are thinking of distributing the package in the UK themselves which would leave the current UK distributors, Activision, in an odd situation. Activision have a 12 month contract to supply Microillusions' software which, says Activision's UK boss Rod Cousens, would be enforced if necessary.

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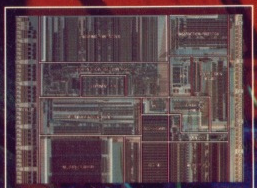
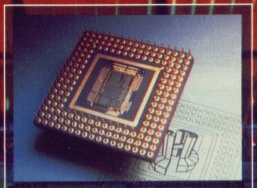


■ Motorola's latest (above and, in *2001* Hal-style, below), the MC88100. This baby is a 20MHz-rated RISC chip with Harvard architecture (seperate data and address bus) boasting on-board floating point co-processor. It communicates via 180 pins! Three such chips can be made to operate in parallel to deliver around 50MIPS of raw processing power.



■ Intel's i860; the world's most powerful processor. It can execute two floating point multiplies in one clock cycle at 40Mhz! The i860 has 3D graphics support – up to 21 million Gouraud shaded pixels per second can be generated. And that's with hidden surface elimination. Put another way, 500,000 four-by-four transformations per second in true colour are possible!

PROCESSING PROGRESS

We've come a long way from the humble eight-bit microprocessor, but there's a lot more potential yet. JEFF LAWSON has been listening to the Silcon Valley boffins' pipe dreams

Sixteen years ago there were no microprocessors. The rate of progress in the intervening years has been phenomenal. Although the techniques used to make them are truly awesome to contemplate, the underlying ideas are actually quite easy to understand.

All computers consist of three basic parts: the central processing unit, main memory (RAM or ROM) and input and output (i/o) devices such as disk drives, display units, and keyboards. Central processing units move data around in memory, and between memory and i/o devices, and perform arithmetic and logic operations on that data. In a microcomputer the CPU is a single integrated circuit called a microprocessor.

There are many microprocessors in use today, described by a dazzling array of letters and digits: 6502, Z80, 68000, 68020, 68030 8086, 80386, T800, ARM, SPARC, i860... the list goes on.

When improving microprocessors, developers attack on four fronts: increasing the amount of data that can be processed at once; increasing the memory the chip can use; speeding up the data processing and improving data manipulation facilities.

ON THE BUSES

The microprocessor is connected to the memory by two groups of wires on a printed circuit board, each known as a bus. One group is responsible for holding the data and is called the data bus. The other group specifies where in memory the data was read from or is to be written to and is called the address bus.

The size of the single piece of data a processor can hold on its data bus is called a word. The Z80 (used in the Spectrum) and 6502 (the BBC micro's chip) have eight-line data buses so their word length is eight bits. The 68000 – present inside STs and Amigas – and 8086 have 16-line data buses and are therefore known as 16-bit chips. The 68020, 80386, ARM, and T800 address 32-bit words and the i860 is a 64-bit processor. A word is the amount of data that can be handled at any instant, each bit being dealt with simultaneously. Clearly data throughput, and therefore processor performance, improves with increasing word length.

REMEMBER, REMEMBER...

The Z80 and 6502 eight-bit microprocessors have 16-line address buses and so can use 65,536 bytes – 64K – of memory. The 68000 has a 24-line address bus and can therefore use 16Mb of memory. However, in the ST and Amiga much of this space has been reserved or assigned for memory-mapped i/o and for access to devices such as blitters.

With the coming of 32-bit microprocessors the limit on addressable memory has climbed to an enormous 4Gb (4,096Mb) of RAM for the 80386, 68020 and T800; 4Gb of memory chips would cost nearly a quarter of a million pounds at today's prices.

Because modern software often needs vast amounts of memory (the PC's new operating system, OS/2, needs around 8Mb to be comfortable) but gigabytes stretch the pocket a little, 32-bit microprocessors usually have virtual memory addressing. This is a hardware scheme to make the different parts of a system think they each have access to a large amount of memory. In reality chunks of data are saved out to disk and other chunks loaded from disk when necessary. In this way the 80386 can make each of up to 16,383 tasks believe they have access to 4Gb. This is a virtual address space of 64Tb (terabytes) – that's 68,719,476,736K!.

SPEED KINGS

All processors rely upon a clock signal to synchronise their activities. The faster the clock signal pulses the faster the processor runs. Clock speeds are measured in MHz (megaHertz). 1Hz is one

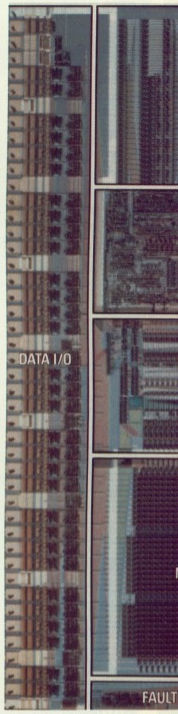
RISCY BUSINESS

Up until four or five years ago new microprocessor designs enhanced the instructions of the previous versions. Chips were produced that performed very complicated instructions in hardware that previously had taken many simpler instructions. This philosophy is exemplified by the 68020 which is a programmer's dream come true. The '020 can execute sexy instructions like 'BFFFO ([540,A3,D2.W*4],79){15:9},D6' which means: read the longword stored at the address formed by adding together 540, the contents of register A3 and the contents of D2.W multiplied by four; to this longword add 78 and use the result as an address from which to read nine bits at an offset of 15 pixels; from the nine bits find the first most significant set bit and place its bit offset in register D6. (Not forgetting to subtract the number you first thought of!)

In the mid Eighties it was realized that if instruction sets were stripped down to a bare – though adequate – minimum, specialised on-chip hardware could make the resulting simple instructions run exceedingly fast – usually in one clock cycle (the '020 instruction above runs in 24 clock cycles).

This strategy of sticking to fewer instructions gives reduced instruction set computer technology, RISC. The T800, 88000, i860 and Acorn's ARM are all RISC microprocessors.

RISC technology is a stop gap. As soon as complicated instructions can be executed in one clock cycle RISC will disappear.



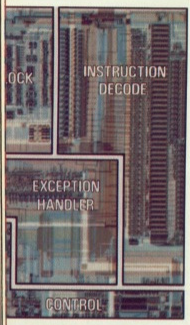
JUST A SWEET TRANSISTOR

Over the years more powerful microprocessors have been developed as new manufacturing techniques have allowed more transistors to be crammed onto a piece of silicon. VLSI (Very Large Scale Integration) chips contain more than 10,000 transistors. This is how the transistor count has increased:

Processor	Transistors
6502	<10,000
8086	30,000
68000	68,000 (!)
68020	192,000
80386	275,000
68030	300,000
i860	1,000,000

IT'S A PLANT

Many thanks to Adriana Velez for providing the pictures of a cross section of a young oil palm root infected with a fungal pathogen. The image in the Contents shows tyloses inside the infected vessels produced by neighbouring cells to counteract infection. The shot on this page portrays fungal deposits in the xylem vessels.



ADDITION DIVIDED

All general purpose microprocessors perform simple addition and subtraction of integers. The 16- and 32-bit devices can multiply and divide as well.

Consider how arithmetic performance has improved: the ST and Amiga have 8/7.16MHz 68000s that can execute a 16-bit by 16-bit integer multiply in an average of 54 clock cycles; the ATW has a 20MHz T800 capable of executing a floating point multiply in 11 clock cycles; the i860 processor can execute two floating point multiplies in effectively one clock cycle at 40MHz!

cycle per second, so 1MHz is a million cycles per second. The 68000 in the ST is clocked at 8MHz and that in the Amiga at 7.16MHz. The fastest machine code instructions that a 68000 can perform execute in four clock cycles. Hence, a 68000 can run two million of its fastest instructions per second (2MIPS). However, many 68000 instructions take much more than four clock cycles (a multiply, for example, can take up to 70 clocks) so the true rating of an 8MHz 68000 is much less than 2MIPS.

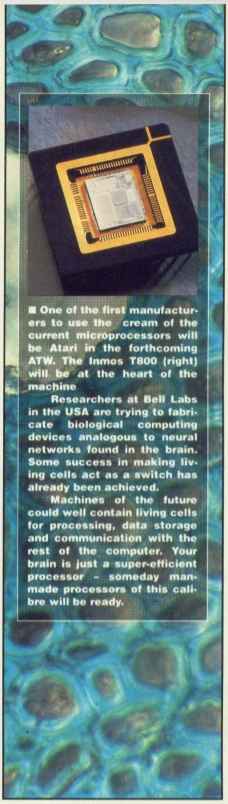
Motorola have produced several versions of the 68000 including devices running at 16MHz. The 32-bit processors such as 68030, 80386 and T800 can run at 20MHz and more. PC compatibles are available with 33MHz 386 processors. The new Intel i860 64-bit microprocessor is expected to run at 40MHz!

TURN BACK THE CLOCK

Superficially, this short history of ever increasing clock rates looks as if it bodes well for the future; there's one big problem though. High-speed RAM chips are very expensive and, in general, dozens of these chips are used with every microprocessor chip. Over the past 10 years or so microprocessor speeds have increased by an order of magnitude while RAM speeds have only doubled. RAM capacity has increased dramatically but not its speed. This means that although a microprocessor is capable of running fast it may have to pause in order to let the RAM catch up: these pauses are called wait states.

Many PC clone manufacturers alleviate the waiting problem by constructing a 'cache' of fast but expensive SRAM (static RAM) between the microprocessor and slower and cheaper DRAM (dynamic RAM).

The cache holds addresses and data of recently accessed memory. Whenever the microprocessor accesses instructions or data the memory management hardware checks to see whether the data is in the cache. If it is then fast access occurs, if not then the DRAM must be accessed which is slower. Because programs tend to repeat instructions in loops and access a small amount of data frequently the actual hit rate with 128K of SRAM can be as high as 95 per cent, so caches can be very effective.



■ **One of the first manufacturers to use the cream of the current microprocessors will be Atari in the forthcoming ATW. The Inmos T800 (right) will be at the heart of the machine**

Researchers at Bell Labs in the USA are trying to fabricate biological computing devices analogous to neural networks found in the brain. Some success in making living cells act as a switch has already been achieved.

Machines of the future could well contain living cells for processing, data storage and communication with the rest of the computer. Your brain is just a super-efficient processor – someday man-made processors of this calibre will be ready.

TEAMWORK

Specialist chips have been developed to act as co-processors – chips that run alongside the microprocessor to help it out with specific tasks. The Motorola 68881 and Intel 80387, for instance, provide trigonometric functions, powers, roots and logs.

Other graphics co-processors can draw lines and polygons, even produce shaded polygons and perform 3D calculations.

In more recent years it has become possible to fit more circuits onto semiconductors and tasks that had previously been assigned to co-processors are beginning to appear on microprocessor chips. The 80486 chip announced last month by Intel, for example, has its own on-board maths co-processor.

PARALLEL LINES

Faster and faster microprocessors run up against the brick wall of memory speed.

Improving instruction execution time would help, but the real leap forward is in parallel processing where several processors can be linked together.

The out and out success in the field of parallelism is the Inmos Transputer. This processor family was designed from the outset to run in parallel; large arrays of Transputers all co-operating together. The Atari Transputer Workstation is currently the finest computer to use Transputers. One ATW can hold up to 17 T800s thus giving 170MIPS. Many ATWs can be connected together providing an enormous processing facility. Inmos were recently recruiting personnel for the development of a 100MIPS transputer!

You may be surprised to know that we, that's you and I, used to own Inmos. The company, which brought to market the world's most innovative microprocessor, the T800, was set up by the last Labour government. The current Conservative government sold it off – it's now owned by the French and Italians. Politicians are supposed to be our representatives, unfortunately they seem to forget that most of the time (that's enough politics – Ed).

INTERESTING TIMES

We are living in fiendishly exciting times – digital computer technology is moving so fast we'll be in the middle of the next century in five years' time!

Intel have just released their new processor the 80486 and Motorola are due to follow shortly with their 68040.... The story continues.■

COMING SOON ON YOUR SCREENS

Current integrated circuits consist of slivers of silicon crystal coated with layers of etched materials forming transistors. Many thousands of transistors are packed into a tiny area of silicon. Other materials, such as gallium arsenide, will be used in fabricating faster semiconductor devices in the near future.

Texas Instruments have announced a quantum-effect transistor occupying an area 100 times smaller than a conventional transistor. These new transistors consume less power and are expected to run thousands of times faster than current devices but won't be available for 10 years.

On a different track, recently discovered ceramics have been shown to exhibit superconductivity at the temperature of liquid nitrogen. Previously much lower liquid helium temperatures were necessary. It is hoped that superconductivity – where the resistance of a wire reaches zero – will be possible at room temperature soon. If so then enormously higher computing speeds may be possible.

Moving away from electricity, researchers at Heriot-Watt University in Edinburgh are trying to construct an optical gate – a logic chip based on light signals. If it becomes possible to manufacture an integrated circuit with light as a signal carrier then its performance will be truly awesome since nothing travels faster than light!

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WORTH OVER £250 which includes 10 Blank Disks, Disk Storage Box, 10 Excellent Games, Mouse Mat, Mouse Bracket (Mouse Holder) Deluxe Paint.

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MPS 1200P
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The Commodore MPS1200P printer presents the state of the art in dox matrix printers, with all the features of a printer that would cost much more. The MPS1200P is designed to be like three printers in one. It can act just like an Epson FX printer, or with the flip of a switch, it can act just like an IBM Graphics Printer with IBM Group II-I character set (Danish/Norwegian character set) support. It can also print all the characters available with the Amiga in the Amiga configuration. The MPS1200P is capable of all the printing functions you would expect, as well as some additional features you may not expect.

MPS 1500C COLOUR PRINTER
£199.99
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A. TECHNICAL CHARACTERISTICS
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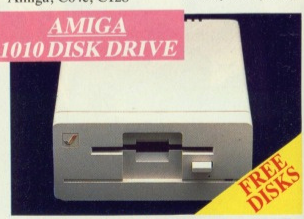
TABULATION SPEED .....2 char/s
PRINTING DIRECTION .....bi-directional, with optimised head movement
PRINT PITHES .....10 char/in to 24/char/in programmable from line, and in SET-UP mode
LINE FEED ..... – 1/6in (4.23 mm), 1/8 (3.17 mm) and 7/72 in (2.4 mm); – n/216 in and n/72 in.
CHARACTER SET .....ASCII characters and special characters.
MAX. PRINT LINE LENGTH .....40 top 192 characters, according to print pitch selected.

AMIGA 1010 DISK DRIVE



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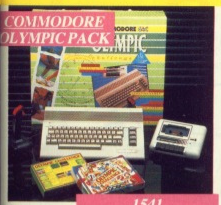

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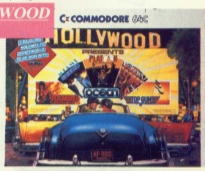

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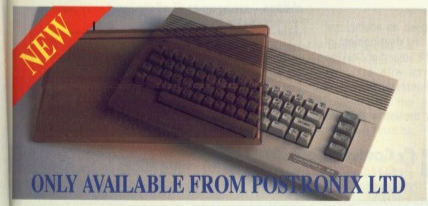

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MIXING Business WITH LEISURE WILL BE A REAL EDUCATION

Commodore computer show

Britain's brightest event for Commodore computer users is back! And there's more to see than ever before.

This show has three main themes covering some of the major uses to which Commodore machines are put. There are over 70 key companies who will be exhibiting their latest products, which means that just about everything that's new in the Commodore world will be on show!

Novotel Exhibition Complex, Hammersmith, London W6
Friday to Sunday
June 2 to 4
10am-6pm Friday & Saturday; 10am-4pm Sunday

Business

Many companies will be demonstrating their latest software and hardware, specially designed to release the full business potential of Commodore computers.

As well as products for the C64 and Amiga series, you'll be able to try out applications for the price-beating Commodore PC compatible micros.

And you'll also be able to attend seminars covering all aspects of using Commodore micros in your business.

Leisure

The C64 and Amiga computers are the most powerful 8 and 16 bit micros for producing fast-action arcade quality games. The range of new software on show will demonstrate how these machines' power is continually being stretched, producing faster and even more addictive games with superb graphics.

If you're a keen game player, you'll find there's so much on offer at the show you're guaranteed a real treat!

Education

Commodore micros are now used as educational tools all over the country. With the development of BBC Basic on the Amiga, and the advent of Desktop Video (combining TV pictures with text and graphics), the range of educational applications is endless.

At the show you'll see how the latest software packages are making real breakthroughs in the educational sector, and be able to try them out for yourself.

Special Events

As well as special events and presentations, you'll also be able to meet some of your favourite celebrities, and maybe get a chance to talk with them about how they use micros in their work.

So for a great day out, whether you want to see what the future holds for Commodore computers, to buy the latest software or to get advice on specific applications, the Commodore show is the place to go. And if you send in the coupon today, we'll knock £1 off the price of each ticket!

● ***For the first time we are offering a family ticket for just £11 allowing entry for two adults and two children – saving up to £7 off the usual entry price!***

How To Get There
By Underground: *Hammersmith (Piccadilly, Metropolitan & District).*
By Bus: *266, 714, 716, 290, 30, 72, 73, 74.*
Car parking facilities available at the Novotel.

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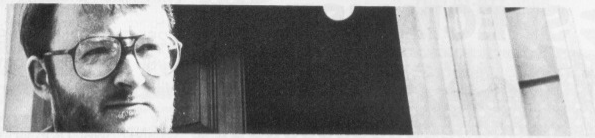

You don't have to take a Greyhound bus to see America and discover what's new at Atari and Commodore – let STEVE GOLD do that.

The hot news from Commodore US is that Max Toy, president of Commodore's US operations, has resigned. The official line is that he has left to pursue 'other interests' – which is the usual line when the company doesn't want anyone to know what's going on.

Toy's replacement is a chap called Harold Copperman, a 42-year-old ex-employee of Apple Computer's Eastern US region. Before joining Apple in September 1987, Copperman served with IBM for 20 years, so it looks as though he has some experience under his belt.

In an inaugural speech that pleased many US Commodore-watchers, Copperman said that he intends to concentrate on pushing the Amiga hard into US educational establishments. In addition, he plans to concentrate on an area that Atari seem to have left behind – dealer distribution.What does this mean for UK Amigans? In the short term, very little. Copperman will oversee only Commodore's domestic US operations, leaving Commodore Europe – headed by Christian Anderson – to run affairs over here.

Copperman will, however, report directly to Irving Gould, Commodore's chairman, so it's a fair bet that most of Copperman's strategies that succeed in the US will find their way over to this side of the Atlantic. Furthermore, if Copperman's plans to establish the Amiga in US schools and educational establishments, we should see some good software appearing in about a year's time.

PIRATES AHOY

The other side of the coin from good software is bad software. Even worse still is pirated software that is corrupted with virus-programs. In the US someone somewhere has cracked Centra Coast Software's *Quarterback* hard disk back-up package for the Amiga. The pirated version is called *Quarterback v3.0*.

Quarterback v3.0 has been sighted on a BBS in Belgium. The bad news is that it is illegal and carries a number of viruses in it. Central Coast Software is currently in the process of tracking down the source of the cracked version (hidden serial numbers do have a use), and has confirmed that *Quarterback v2.2* is the latest official release.

So, if you do see a 'public domain' version of *Quarterback* on your local Amiga BBS or on-line system, you have been warned. If you don't think that software piracy is a bad thing, fire up *Quarterback v3.0* and watch what happens...

Many software houses in the US are responding to the problem of piracy by protecting their packages – usually by taking advantagesof some of the quirks of the Amiga's operating system. The problem is many of the early software protection systems on the Amiga are not at all happy with the latest Kickstart ROMs.

KSW, an Ohio-based company, has come up with a low-cost solution to the problem: a *Kickswitch* module. The $49.95 module fits inside the Amiga A500 and 2000 series, and allows two sets of Amiga Kickstart ROMs to be fitted. Switching between the ROMs is simply a matter of flicking a switch. Further details from: The KSW Company, PO Box 160-AT, West Milton, Ohio 45383.

There are a number of utility packages coming on to the market that allow users to modify the Amiga icon system. The problem is,many packages are in the £70 to £80 price range on this side of the Atlantic.

In response to a number of requests, Andy Kartsatos in Florida has upgraded the *Hermes Iconlab* package. The latest version (V1.2) – which costs a very reasonable $30 – has all of the features of the expensive packages, including the ability to split, cut, save and manipulate icons. It's even possible to work with eight-colour icon pictures. Most interesting of all, the package allows the icon data to be modified. Further details from: A G Kartsatos, 8524 Caladesi Island Drive, Temple Terrace, Florida 33637-7310.

Finally this month, there's just room to mention that the World of Commodore show takes place from the 19th to the 21st of May in Los Angeles.

POCKET ATARI

Over in the Atari corner meanwhile... even the most die-hard Amiga fans cannot have helped but notice Atari at Comdex in April. The reason? Why, the Pocket Portfolio, of course. The Yanks were wowed by the Pocket Messy-DOS portable, which will retail for $399.95 in the US. As mentioned in last month's column, rumour has it that Atari have contracted with DIP to produce a second version of the Pocket Portfolio. These rumours were amplified at the Portfolio's US launch at Comdex. The Mark II machine is now expected to be 80286 microprocessor-based giving it PC-AT compatibility and speed, and will feature an optional two-inch hard disc drive. Two inch drives have recently been produced by several Japanese firms, the most notable of which is Citizen.

The Citizen unit is capable of being fitted inside the Pocket Portfolio's case, but it could add around $300 to the unit's price. This should translate into a £200 price supplement on this side of the Atlantic, but it's likely that a MK II80286-based Portfolio, with hard disk, will retail for around £800 pounds

The good news for Stacey fans at Comdex is that, although both the laptop ST and the abovementioned Pocket Portfolio were only shown in glass cubes to the public, Atari have now confirmed the specifications of the machine.

Stacey will feature TOS v1.4 fitted at standard, but – sadly – no blitter. Sources suggest that Atari US is considering offering the blitter as an optional extra.

Specification-wise, the entry-level Stacey will be like the 1040STFM with 1Mb of RAM, and single DS/DD drive. Some comics on the stand suggested that Atari are planning to use up all the1040 components in the Stacey, now that news of the 1040 ST's demise seems to be leaking to the public.

PASSING THE PORT

One of the (few) advantages of using a PC instead of an ST is that the PC has multiple serial ports. Double Click Software have released a multiple I/Osystem for the ST called *DC Port*.

***DC-Port* is a serial expansion cartridge that plugs into any of the ST series' cartridge slots. The $199.95 unit draws its power from the cartridge slot, so there are no messy wires hanging around. Furthermore, the unit is completely interrupt-driven, and can thus be addressed from within software.**

If that's got you drooling, then just listen to this: the serial port on *DC Port*, which can be addressed concurrently alongside the ST's existing serial port, can handle 38,400 baud full duplex. With US Robotics' latest modems working at 19,600bps, the days of 38,400 bps modems are not far off.

Double Click is distributing the *DC Port* system via mail order in the US, and also via Michtron, so we should see the unit on sale on this side of the Atlantic quite soon. If you can't wait, write to Double Click Software at: PO Box 741206, Houston, Texas 77234-1206, or call their BBS on 0101-713-944-0108.

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DIGITISED DAYDREAMS

■ The large image on this page – believe it or not – is a 4,096-colour screen taken from an ST. The picture was originally grabbed on an Amiga and then transferred to the ST via *Dos to Dos*. The picture above, Raven's Oath, is artwork taken from Chris Achilleos' *Sirens*.

You have some artwork or photographs that you want reproduced on your machine's screen; how do you go about it if you haven't the time, hardware or knowhow? Call Photofile! RICHARD MONTEIRO reports on the firm's activities.

Put two machines side by side – for argument's sake, an ST and an Amiga – hook a colour video digitiser to one of them and add a program that will let you read and write both ST and Amiga format disks. Supply a black and white or colour picture and get digitising. That, in a nutshell, is what Photofile get up to. You send them photographs and in return you get a disk containing the digitised images – in up to 4,096 glorious colours. So how's it done?

For digitising pictures, Carl Young at Photofile uses *Digi-View* on a 2Mb Amiga A500. The extra 1.5Mb are provided by an internal Spirit RAM expansion board. Because none of the ST video grabbers on the market offer true-colour image capturing, Photofile decided to use the Amiga to do the digitising. That and the fact that the Amiga has a 4,096-colour mode as standard.

Digi-View uses three scan speeds: fast, normal and slow. The slower the scan rate the more accurate and sharper the picture. All pictures are scanned in slow mode regardless of whether they are colour or black and white. This process can take as long as five minutes for a high resolution interlaced colour picture. Such a picture devours almost 2Mb of memory. A standard A500 or A2000 will throw you back into Workbench with a 'not enough continuous memory' error if you try to grab pictures in anything more than interlaced HAM format.

A special type of bulb is used by Photofile which simulates daylight and cuts out red light emitted by normal bulbs. The red light causes a yellowing in what are supposed to be white areas of grabbed images.

Amiga pictures can be digitised at any resolution – and in either PAL or NTSC standard. ST pictures are digitised in 16 (or fewer) colours in 320 by 200 low resolution NTSC mode. This mode is common to both machines.

STs – or rather several ST paint packages – can read IFF files, but they can't read AmigaDOS disks. To get round this, Carl uses *DOS to DOS* on the Amiga to write to an ST formatted disk.

The next stage involves using an IFF-to-ST file conversion utility on a 1040 ST. PBX images (the file extension used in Eidersoft's 4,096-colour ST paint package *Quantum Paint*) – are done in exactly the same way except they are saved as 320 by 200 HAM pictures on the Amiga and after being transferred are loaded into *Quantum Paint* which, incredibly, recognises HAM format.

Power Computing have given Photofile permission to distribute the SHOWPBX.PRG slideshow utility – this enables the 4,096-colour PBX pictures to be displayed without the need of *Quantum Paint*. Of course, you need *Quantum Paint* if you wish to edit the images.

■ **Photofile's digitising service at its best. The original artwork was grabbed by Carl at Photofile using Newtek's Amiga video digitiser. The camera was a Vidicom from Norbain Imaging. The image shown here was grabbed by the Amiga in HAM mode – no retouching inside a paint package was done. Similar quality on the ST is possible when *Quantum*'s 4,096-colour mode is used.**

HAM PLUS

Not a double-sized cheese and ham sandwich, but the term Newtek have given to the dithering technique used in their Digi-View video digitising software. The special effect makes 4,096 on-screen colours look like 100,000. HAM+ files are identical to HAM files and can be edited using *Photon Paint*, *Prism* and *Digi-Paint*.

■ ***If you're interested in Photofile's services you can contact them at PO Box 196, Nottingham NG2 4GQ (0602 261498). Amiga digitised pictures can be saved in HAM, HAM+, halfbrite, high-resolution colour and low-resolution colour. Each colour grab costs £1.50 while mono grabs cost £1. ST file formats supported include NEO, PI?, ART, IMG, DOO, TNY, and PBX. ST prices are identical except for PBX format which costs £2. For a limited period until May 26, Format readers will get a free picture digitised for every five they send.***

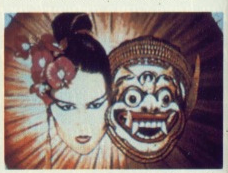
GRAB 'EM YOUNG

This is Carl Young, Photofile's 28-year-old production manager. Originally Photofile provided an Amiga-only digitising service; it could well have stayed that way as Carl explained: "When we first decided to expand the service to include the ST, we tested the more popular ST digitisers and discovered they were all geared towards speed rather than accuracy. Most worrying, though, was the fact that no ST digitiser offered true-colour grabbing. We were completely dissatisfied with the results from these digitisers so we looked into the possibility of porting pictures from the Amiga to the ST. At first we thought that we would have to connect the two computers together via an RS232. Then we discovered the wonders of *DOS to DOS*."

■ **Unbelievable but true! The picture above (nicked from *Viz*) is a 16-colour ST *Degas* image.**

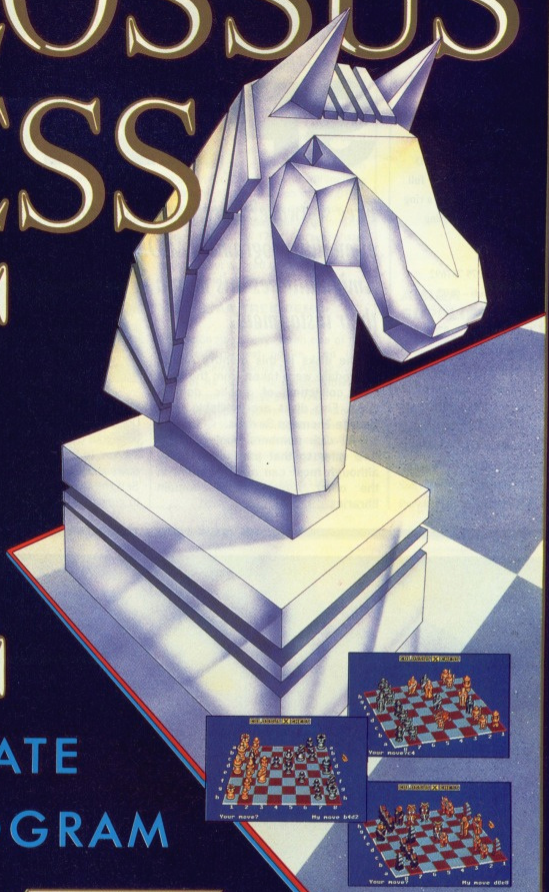
■ **4,096-colour overkill: enhanced HAM at its best. The picture is from Chris Achilleos' art book *Sirens*.**

■ **Even Amiga halfbrite images look spectacular. This shot shows what's possible in the 64-colour mode.**



■ **Who says the ST can't rival Amiga graphics? 4,096 colours in *Quantum Paint* format. Fantastic.**

COLOSSUS CHESS X



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PUBLIC SPEAKING

Free software? Surely you jest – but no, the public domain holds a vast array of quality programs. JASON HOLBORN takes a look at some of the range of Amiga utilities this month – ST owners will have to wait until next month for their installment.

All the disks in this month's Amiga PD Update were taken from the Fred Fish collection of public domain disks. Fish disks are available from George Thomson Sevices.

All disk numbers quoted therefore refer to that particular library although most can also be found in the other Amiga public domain libraries.

ST SUPPLIERS

In the UK, the following companies distribute PD software. To find their full addresses, give them a ring or scan the advertising pages.

ST UK – 0279 757692
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FloppyShop ST – 0224 691824
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PLATINUM

SETFONT: DISK 182

Does the standard Topaz system font bore you? Do you yearn for a more exciting font to liven up your Workbench windows and your CLI consoles?

SetFont is a little utility that allows you to change the default Topaz font for any Amiga font of your choice. If you do not have any suitable fonts, you could design a more pleasant font using the FED font designer tool on your Extras disk and then use *SetFont* in your Workbench StartUp-Sequence to automatically change to your new, customised font.

Font sizes aren't restricted to the standard ones, although the screen

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Commodore 64 screen shots

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■ *SetFont* in action. Here we've re-assigned Topaz to a more olde-worlde font.

does tend to get rather cluttered when using larger fonts.

FRACGEN: DISK 188

Judging by the vast number of complimentary letters and phone calls we received about the *Scenery* program on cover disk #8, you lot certainly seem to be into the generation game. We are of course speaking about the fractal generation game and not Larry Grayson's 'Shut that Door' variety!

FracGen is another in the ever popular breed of fractal graphic generators that seem to be the current flavour of the month in the PD libraries. This particular program is most certainly one of the easiest of these to use and the results can often be nothing short of astounding.

So you already know that both the ST and Amiga PD libraries are great for picking up quality utility and games software at next to nothing, but what else is available?

Dig deep and you'll find a large number of programs that could quite rightly be deemed useless but are kept because of their aesthetic value. We are of course talking about the hugely under-rated range of demo programs available for both the ST and Amiga.

What are demos? Put simply, demos are programs written to show off one or more aspects of the particular machine they were written for.

Probably the most famous examples of the genre are the Amiga Bouncing Ball and the Juggler demos on the Amiga, and The BIG demo and

■ The starship Enterprise moves slowly forward into the cosmos.

DEMOS CORNER

The Snowman on the ST.

Each month, we'll be sifting through all the latest and greatest demos on both the ST and Amiga and picking one on each machine that we think best shows off the ST or Amiga. How will we judge each demo? Well, if it makes the entire *Format* team go "Wow!" and fall over backwards, then it's a winner. Other criteria will include originality and how much of the ST or Amiga's capabilities are exploited.

The demo featured this month was supplied by 17Bit Software who can be contacted on 0924 366982. The disk number quoted therefore refers to that particular collection.

STAR TREK DEMO DISK 329

Animation has always been one of the Amiga's strongest points, and this demo certainly shows the Amiga hardware at its best. The demo shows a scene from the first *Star Trek* film in which the Enterprise moves slowly from out of the dry dock that orbits the Earth. The four different views of the action give an movie-like quality to this excellent demo.

Star Trek needs at least 1Mb.

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- **Mega 4:** Graphics Pack. Graphic packages and utilities. Disk 1 contains Neochrome a colour only paint package and Master Painter a fabulous all features monochrome and colour art package. Disk 2 is full of picture converters. Disk 3 has Public painter a brilliant monochrome package.
- **Mega 5a:** Bible Pack 1. King James version of the Holy Bible Old Testament.
- **Mega 5b:** Bible Pack 1. King James version of the Holy Bible Old Testament.
- **Mega 6:** Bible Pack 2. As Mega 5a and 5b but on 3 Double Sided disks
- **Mega 7:** Games Pack 1. Diamond, Football and Blitz III.
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VISA

As yet it's not possible to achieve the kinds of computer animation on the ST and Amiga which dealt with by the larger machines. The French company GixImage produce software capable of broadcast-quality animation on the PC, although there are distinct moves in the right direction on the ST and Amiga scene. Amiga CAD packages offer the kinds of colour routines to make animation easier and this is reflected by the emergence of high-end CAD packages on the Amiga. Equivalent ST software is out in the shape of *Campus CAD*.

© RSCA

THE CASE FOR CAD

CAD offers exciting opportunities in the complex field of animation. We look at packages specifically aimed at ST and Amiga owners. MARK HIGHAM delves into the CAD caverns.

The progression of professional CAD from the likes of the Cray supercomputer down to the ST and Amiga has not been an especially easy one. Limitations in hardware have made the high end of the market inaccessible to even the Amiga, which boasts enough clever hardware to make it the most likely candidate for serious graphics-handling packages. However, that is not to say that adequate CAD programs cannot be found on either machine.

CALCULATING CAD

Entry-level packages on the ST and Amiga are hard to come by. The requirements of even the simplest CAD software make dedicated and ultimately expensive packages the only real option, and even these lack the kind of professionalism which might be expected.

Intro CAD on the Amiga comes from HB Marketing and, at £59.95, is perhaps the nearest thing to an entry-level package. It's simple enough to use and is designed to produce everything from illustrations for reports to floor plans and circuit diagrams.

Where *Intro CAD* performs best is in its extensive library of pieces which permit parts to be grouped together so that an image may be designed using these different sections. This technique is not, however, nearly as extensive as that employed in Electric Distribution's *Cyber Studio*.

This package boasts a standard design style which is also reflected in *Design 3D*, a Gold Disk CAD product for the Amiga.

When *Cyber Studio* was first conceived it was intended to play the role of an entry-level package which could be expanded with the aid of all sorts of extra packages to become a top of-the-range piece of software. This has been achieved brilliantly.

Cyber Studio contains the most popular ST CAD package – *Cyber CAD* as well as *Cyber Mate*, an animation program. But in addition, Electric have recently distributed *Cyber Sculpt* – probably one of the best design programs on the market for the ST – as well as a myriad of animation programs. These include the *Cartoon Design* disks and the *Microbot Design* disk (both reviewed in issue 11) which contain basic blueprint designs of the relevant bits and pieces of cartoons and robots which may be imported into *Cyber CAD* and combined, shaded and coloured. Hence, an extensive library of sections may be created.

GOOD DESIGN

The equivalent Amiga package in this range is *Design 3D* from Gold Disk (HB Marketing). It offers a superior 3D environment and utilises the extensive colouring routines capable on the Amiga so that all sorts of filled 3D effects can be obtained and rotated at speed. Text has also been accommodated in this package, a feature sadly lacking from *Cyber Studio*.

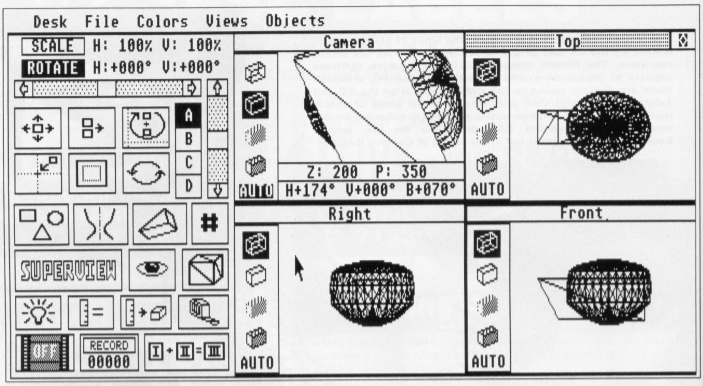
Cyber Studio is a GEM-based system with standard drop-down menus and clickable icons – the same technique as that employed in *Design 3D*. Desktop accessories can be accessed in the usual way although they must not take up too much space on the smaller memory machines.

Cyber CAD can run on a 520K ST although at least a 1040ST is recommended for serious use. *Design 3D*

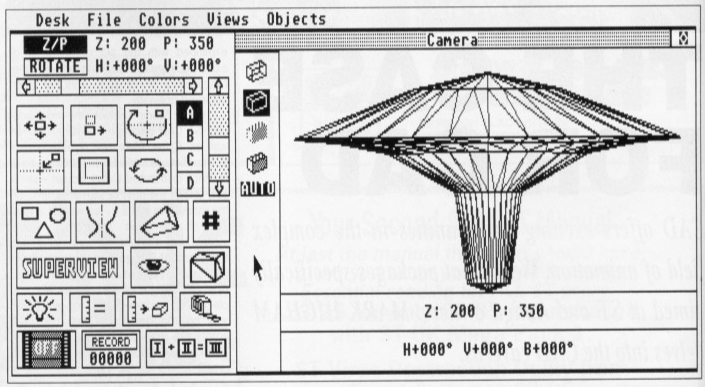
INTRO CAD
Gold Disk/HB Marketing
£59.95
Tel: 0895 444433
Amiga.

DESIGN 3D
Gold Disk/HB Marketing
£79.95
Tel: 0895 444433
Amiga. 1Mb of memory required.

CYBER STUDIO
Electric Distribution
£74.95
Tel: 0480 496789
ST. 1Mb machine an advantage.



■ *Cyber Studio* **in action. The front screen shows the four different windows where all the action takes place. These are regularly updated.**



■ **The camera view can be blown up to give you an idea of the finer points of your image. Zoom and perspective controls can then be manipulated and these are applied to the 'super' view – a 3D shaded and coloured view of the image.**

requires at least 1Mb of memory to use it properly.

FIRST DRAFT

CAD can be divided into two specific sections: drafting and 3D imaging. *Cyber Studio* and the Amiga's *Design 3D* fall into the latter category which reflects far more interest in the animation side of CAD.

The basic design screen is split into four windows which provide a view of the 3D image from several different angles. You only work on one design but the changes are reflected in all windows whenever they are updated.

The first step in creating any 3D image is to set up some basic shapes. CAD images tend to be in a very blocked style with harsh, angular lines scattered everywhere. This is because most designs must be constructed using polygons which can then be further manipulated.

The best way to go about getting your design into the machine is to draw a rough approximation of the idea and split it up into 3D blocks. So, for example, a house can be neatly converted into a set of block structures. These can then be very simply created using a CAD package and merged in together so that you can end up with the design that you originally planned. Any type of polygon can be created very easily using these techniques. Facilities to spline these lines will usually add an acceptable curve to complex shapes.

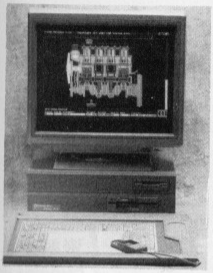
All sorts of features may be added to these basics depending on the package used. It is this area which is dominated by the sophisticated *Cyber Sculpt* package, boasting all sorts of features including revolving user-created lines around any axis as well as dragging sections of a design and pulling them out. (See issue 10 for full review)

With both *Cyber Studio* and *Design 3D* the next step in the design is usually to set lighting sources and intensities as well as deciding colour shades for specific appearances.

Both packages offer the facility to view the design as a simple 3D wire framed image and then revolve it through all manner of angles and perspectives. A special super-view supplies the perfect 3D picture of your design, boasting all kinds of colour shades from any selected viewpoint.

One of the most obvious essentials in this type of package is to provide a hard copy output of the design. The Amiga's *Design 3D* is far more suited to professional use in this area with output to plotters being an integral part of the software. Both packages do, however, offer output to Epson printers at the very least.

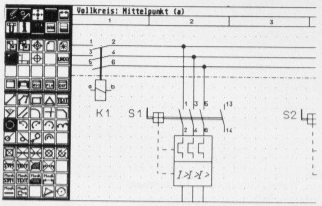
The ability to save screens is another important aspect and both offer the chance to save the design complete with colour palettes and lighting shades. The format that *Cyber Studio* saves its picture data into is acceptable by all other Cyber products including their paint package *Cyber Paint*.



■ ***X-CAD* is, without doubt, the most professional system on the Amiga to date. The package alone is out of the price range of most home users but add to that the cost of all the hardware – A2000, hard drive, graphics tablet and plotter – and you'll wonder if you're playing with Monopoly money.**

These two packages make up the basis of the CAD scene on the ST and Amiga as far as the less advanced systems are concerned. However, the wealth of facilities on the Amiga makes it a likely candidate for more intense professional competition. *X-CAD* from Taurus expands enormously on these basic principles offering the type of professional CAD system required by those with specific interest in the business applications market.

■ ***Campus CAD* is a drafting package from Precision Software. At £395, it comes as one of the more expensive options to animation CAD. Being a GEM-based system, it aims to be as simple to use as possible and a host of icons assists here. *Campus CAD* is designed to produce 2D images in a similar way to a paint package but with far more attention paid to the working area. All sorts of hatching techniques aim to make up for lack of colour but the real benefits come in accurate mirroring and rotation as well as a range of dimensioning features. Input can be via keyboard, mouse or digitising tablet and output can go to standard Epson-compatible printers, the Atari laser printer and a range of plotters.**



The high-business end of *X-CAD* is reflected in the hardware which is required. The basic program needs 2Mb of memory and a hard disk to make it a viable proposition, and a graphics tablet and plotter can both be added to make input and output more acceptable. The graphics tablet is the input device used by the vast majority of professional CAD systems so it really does pull *X-CAD* out of the home user market.

The *X-CAD* range is split into two packages – *X-CAD Designer* and *X-CAD Professional*. Each expands on the unrefined techniques of its predecessors by including a range of additional features including easy-to-use isometric grids which can be used as a basis in the creation of less traditional designs.

Re-drawing on the *X-CAD* package is one of its finest points since it is faster than on professional PC 386 machines, even on very complex designs. The higher screen resolutions on an Amiga make such designs a possibility and with colour implemented as well the results can be far superior to any other ST or Amiga CAD software.

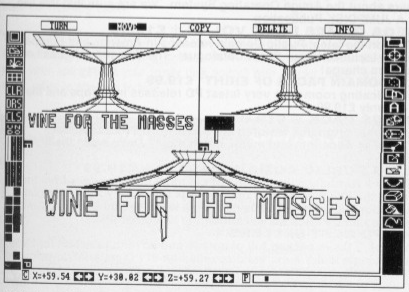
FIGHTING IT OUT

CAD on the ST and Amiga is usually aimed at the home enthusiast where animation is often the only serious use. With these machines being very graphically orientated it's not surprising that such CAD packages have found a home serving this scene. For ST owners there are a shoal of smaller CAD packages but *Cyber Studio* is certainly one of the best. Besides being extremely well-supported by animation disks and the whole range of Cyber products, *Studio* offers a very user-friendly environment particularly for the novice CAD fan. *Design 3D* is the equivalent Amiga package which has, without doubt, one of the clearest manuals with superb tutorial sections.

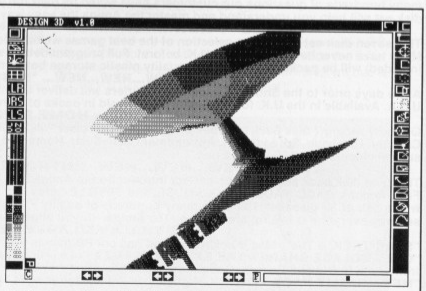
The pricing and hardware requirements of *X-CAD* really put it out of the scope of all but the most serious user. However, if your main reason for buying your machine is CAD then the A2000 and *X-CAD* is certainly worth the money. Commodore market both and are currently offering special discounts.

X-CAD
Commodore
£199.95
Tel: 0628 770088
Amiga. 2Mb of memory required. Hard disk an advantage.

Professional Draw from Gold Disk at £139.95 offers a 2D drafting environment for Amiga owners. It's more of a paint package with a range of colour and paint options; however, it still offers exceptional quality with super-fine lines an option.



■ ***Design 3D* is capable of some brilliant results. 3D planes can be manipulated easily with views from four different angles possible. Spinning and mirroring routines make the creation of the basic shape easy enough.**



■ **The icons down the side of the window control everything from grids, useful in precision work, to drawing and painting features. It's the extensive use of colour in Amiga CAD packages which makes them more suitable for animation.**

M.A.S.T.

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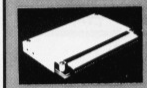

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G.T.S.

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✻ JUMPDISK ✻ JUMPDISK ✻ JUMPDISK ✻ JUMPDISK ✻

Among the feature packed May issue are the programs - Sound Machine: A tool for generating the Data necessary for programming sound on the Amiga. Video Poker: Simulates electronic poker machines found in Las Vegas Casinos. Glasnotes: Self contained text and graphic sketch pad that will also encrypt and decrypt a screen graphically. PLUS the logic puzzle game of Stepping Stones, Latest News Features from the USA, Tutorials, Reviews and MUCH, MUCH MORE! All for only £8.50 inc.

£14.95 ✻ NEW...NEW...NEW... "DOSLAB" ✻ £14.99

Yes at last it's available! The new interactive way of learning how to use the CLI and AMIGADOS. This program takes into account the many hundreds of questions our customers have asked us over the years about the Amiga Operating System. We are sure that this two disk set will help you understand and master the Amiga the easy way. A JUMPDISK Publication.

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This seven disk set contains a selection of the best games we have found on the latest Public Domain releases in America and Europe. Many have never been seen in the U.K. before! Full program details will be included in our Show Catalogue - The first 100 sold (mail order included) will be packaged in a stylish quality plastic storage box at no extra charge!

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£19.99 ✻ HOME BUSINESS PACK ✻ £19.99

Our best selling 7 disk pack includes a "System's Exerciser" disk FREE! Other programs featured include a Word Processor, Spell Checker, Database, Spreadsheet. Appointment Scheduler, Home and Business Accounts and much, much more. Once again the first 100 sold will include a FREE storage box.

£19.99 ✻ NEW...NEW...NEW "INTRODUCING PUBLIC DOMAIN PART I" ✻ £19.99

This nine disk pack serves as the perfect introduction to Amiga PD. We have carefully selected one of the most popular disks from the Fish, Amicus, SACC, FAUG, TBAG, AMUSE, and TBYB Libraries and added the latest version of our two disk PD Library Pack, complete with a pair of 3D glasses! There are many hundreds of quality PD disks in our collection and this new pack will give you the opportunity to see why everyone is talking about PD on the Amiga. (If you already own the Library Pack we will substitute two other disks)

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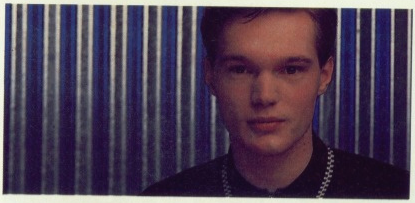
ST Amiga Format's unique dual-format disk gives you the best software fromof both ST and Amiga worlds. JASON HOLBORN is your guide through this month's pot-pourri of proggies.



DISK EXTRA

ST

New to the ST? See page 40 for full loading details

FLAIR PAINT.....35
Take a look at the art package that's making more than a few heads turn in the world of ST art. *Flair* contains the kind of features that previously you could only dream about.

ZAPST.....36
Anyone remember the *NewZap* disk editor we featured on our cover disk in issue nine of *Format*? Of course you do! But here was a problem; it was for the Amiga only. *ZapST* does the biz for frustrated Atari owners

TYPIST.....36
How do you rate your typing skills? If, like the *Format* team, your typing is restricted to the age-old 'hunt and peck' technique, then *Typist* will have your pinkies dancing to a new beat in no time at all.

SPRITE ST.....36
Designing and animating sprites is a task that every would-be games programmer has to learn sooner or later. With *SpriteST*, this process is made considerably easier.

TRACK IT.....38
Are you having problems trying to track down that rogue disk error that hides when you get out your trusty disk editor? With *TrackIt*, those disk errors will have nowhere to hide.

AMIGA

New to the Amiga? See page 40 for full loading details

COLOSSUS CHESS.....34
Do you think of yourself as bit of a Karpov where chess is concerned? Bet you can't beat *Colossus*! Who needs laser cannons, throwing stars and Ferraris when you've got a game that is as utterly addictive as chess

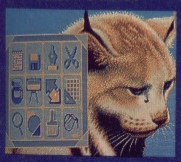
BOOT INTRO.....35
Add that little bit of extra sparkle to your work disks with this handy little program. *Boot Intro* allows you to put your own little scrolly messages onto the front of your disks.

VIRUSX 3.10.....34
Format, champion of the cause to completely eradicate all known virions, presents the latest release of the program that is generally regarded as THE Amiga virus killer.

TASK CONTROL.....34
The Amiga's multi-tasking system is not exactly the most stable of working environments. With *Task Control*, you can nuke those rogue tasks before they get a chance to get help from the guru.

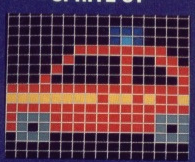
TUNNEL.....36
Fun and frivolity is what *Format* is all about (particularly when the Editor isn't about) and so we present our latest useless but fun program that is guaranteed to send you running for your dark glasses!

FLAIR PAINT



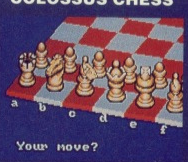
Draw your own micro masterpieces with *Flair Paint*, by far the most advanced paint package on the ST.

SPRITE ST



Sprite editors are a vital part of every games writer's armoury, and *SpriteST* is one of the best you can get.

COLOSSUS CHESS



Games don't come any more addictive than the centuries-old war game of chess. *Colossus* takes it into the 80s.

WIN WIN WIN...

£800

SEE PAGE 38

All you have to do to become wealthy is write the most superb program we've ever seen. Easy huh?

■ **Select 'PIECE SET' from the menu and you can change the pieces to any one of four different styles.**

AMIGA

COLOSSUS CHESS

PROGRAM: BY CDS
MACHINE: ALL AMIGAS
FILES: CHESS

Do you rate yourself as bit of a Kasparov beater? Then why not try your hand at the latest, and most certainly the greatest chess program to appear on the Amiga. We at *Format* certainly tried our best to beat *Colossus* but our pathetic attempts were miserably crushed in no time at all. Can you beat what is quite simply the ultimate chess program?

The demo version on this month's disk a cut down version of the full game. Our demo gives you 10 moves in which to either beat the computer or be beaten yourself (so far, the latter has been more correct!).

To move a piece, just click on it and then click on the square you wish it to be moved to. Alternatively, you can keep the mouse button depressed and then drag the piece across the board yourself.

One of the nice features of *Colossus* is the extent to which you can customise the chess board and all the different pieces. Even in our cut down version, you can change the appearance of all the pieces into any one of four different styles, ranging from oriental to futuristic.

You can also change the orientation of the screen, either from 2D or dazzling 3D. When in 3D mode, you can even change the angle at which the screen is viewed by clicking on the base of the board, and, while keeping the left mouse button depressed, moving it around with the mouse.

■ **The more conventional 2D mode is also available for the purists among you.**

GETTING GOING

You can load the *Colossus Chess* demo in two ways. The first, and simplest method is to insert our cover disk at the 'Insert Workbench' prompt and *Colossus* will automatically boot up.

Alternatively, you can load *Colossus* by double clicking on the CHESS icon on the Workbench. From Workbench, the computer will ask you to swap disks several times as the game loads; just follow the on-screen requesters and everything should load OK.

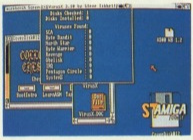
AMIGA

VIRUSX 3.10

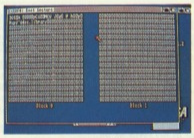
PROGRAM: PUBLIC DOMAIN
MACHINE: ALL AMIGAS
FILES: VIRUSX, VIRUSX.DOC

The constant fight against computer viruses has always been a bitter one. As new viruses are released upon the world, anti-virus writers frantically code new and more powerful virus killers. The latest, and certainly the most dangerous of Amiga viruses is the dreaded IRQ. Who can save us from this merciless killer of disks? *VirusX 3.10* of course.

■ **How could a little, seemingly innocent window be such a killer?**



■ **Click on the *VirusX* window bar and then click the right mouse button and a complete rundown all viruses found will pop up.**



■ ***VirusX* also allows you to view the boot block of a disk; useful for identfying viruses.**

VirusX 3.10 is the latest, and most powerful release of the popular virus detector/killer that is generally regarded as the best available. As well as the more mundane viruses such as the SCA and Byte Bandit strains, *VirusX* will also trap and kill the more obscure viruses such as the Byte Warrior, North Star, SystemZ and even the illusive IRQ virus.

Once loaded, *VirusX* sits in a little window in the Workbench title bar and monitors every disk that is inserted into the machine there after for any potential viruses

When a virus is found, *VirusX* will instantly inform you of its presence and then give you the option of exterminating the little blighter.

GETTING GOING

You can load *VirusX* by double clicking on the VIRUSX icon on the Workbench. Full instructions on using the program are included in the VIRUSX drawer.

AMIGA

TASK CONTROL

PROGRAM: PUBLIC DOMAIN
MACHINE: ALL AMIGAS
FILES: TASKCONTROL, TASKCONTROL.DOC

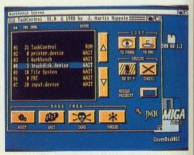
When the Amiga was originally released, the machine was hailed as a breakthrough in terms of price and performance. One particular area that received more than a few rave reviews was the Amiga's advanced message passing, multi-tasking operating system. The Amiga was the first personal computer to offer true multi-tasking at any price.

Unfortunately, those first rave reviews soon turned to bewilderment as the Amiga operating system showed its true, unreliable colours. Most multi-tasking operating systems have two major features that the Amiga operating system sadly lacks; memory management and task security. These two features are designed to stop a task that goes haywire from bringing the entire system down as well.

So what do you do when a task decides it wants to go out of control? Use *TaskControl* naturally!

TaskControl is a very nicely presented tool that allows you to mercilessly kill rogue tasks before they can do any harm whatsoever. Used in conjunction with a guru killer such as the *Gomf!* utility featured on cover disk #5,

■ **Nuking a task in its tracks**



■ ***TaskControl*'s very pretty user interface.**

LOADING THE OTHER ST PROGRAMS

This month's demo of *Flair Paint* is set up so that it will automatically load when you reboot with our cover disk in drive A. To access the other programs on the disk, either reboot your ST with a disk that allows you access to the Desktop in drive A or reset your ST with the *Format* cover disk in drive A while keeping the CONTROL key depressed and the Desktop will appear.

TaskControl will provide you with a guru-free operating environment. Other features offered by *TaskControl* include:

- SEND TASK TO SLEEP Just point and click on a particular task, then select sleep and the task will be sent into immediate slumber.
- KILL TASK Zap that rogue task before it gets a chance to wreak its vengeance on the Amiga. Just click on the task to be 'nuked' and then select the kill gadget.
- SET PRIORITY Turbo charge any task by changing its execution priority; the higher the priority, the faster your task will run.

GETTING GOING

You can run *TaskControl* by double clicking on the TASKCONTROL icon on the Workbench. Full instructions are available within the TASKCONTROL drawer. This is a fairly techie program and therefore should be used with some caution.

AMIGA

BOOT INTRO

PROGRAM: PUBLIC DOMAIN
MACHINE: ALL AMIGAS
FILES: BOOTINTRO, BOOTINTRO.DOC

If you've seen any of the various demo disks that are available for the Amiga, then you'll have noticed that probably the most common is the classic scrolling message. With *Boot Intro*, you too can add that personal touch to all your work disks.

Boot Intro, as the name suggests, writes a very fancy scrolling message to the boot block of your disk. All you have to do is enter a title for your demo and then enter the message text that is to be scrolled and then select 'SAVE' and your scrolly message will be written to the disk in drive df0:. Once the message is entered, you can choose the font, the speed of the scroll and the colours used. Finally, you can choose to have the message scroll in a straight line or in a sine wave.

ST

FLAIR PAINT

PROGRAM: BY DATABASE SOFTWARE
MACHINE: ALL COLOUR STS (LOW RES ONLY)
FILES: FOLDERS: AUTO FILES: CONFIG_C.TOS, FLAIR.DOC, FLAIR_C.TOS, FLAIR_P.ACC, FLR_FNT.DAT, LOADER_C.COM, TABLET_C.DAT

When *Flair Paint* was originally released, it was heralded as a milestone in the history of computer art on the Atari ST; no other paint package can compete with the vast number of advanced paint features that *Flair* offers. *Format*, in conjunction with the authors and Database Software, bring you an exclusive demo of the paint package that every ST artist is talking about.

■ **The customisable airbrush gives you fine control over your painting**

Our cover disk demo is a complete copy of the low resolution version of *Flair*. The only difference between our demo and the complete program is that all save operations have been removed and a time restriction has been added. However, the program does allows you to have up to half an hour's doodling time before it stops execution.

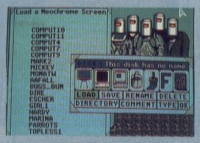
We think you'll agree that *Flair* is definitely a program to be reckoned with. The entire program is controlled through *Flair*'s very easy to use pop-up menu system which is very quickly mastered. With all programs that are as complex as *Flair*, the best way to get the hang of it is to experiment.

■ ***Flair Paint* – the ST's seen nothing to touch it when it comes to computer art**

GETTING GOING

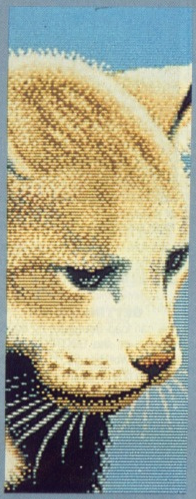
You can load our demo of *Flair Paint* by resetting your ST with our cover disk in the internal drive (A:) and our demo will autoboot.

After a few seconds of disk access, the *Flair Paint* configuration menu will pop up giving the option of either loading the *Flair Paint* program or changing the configuration. Do not change the configuration on your original *Format* master disk but instead, select 'Load Flair' to enter the main program. Make a back up if you want to change the configuration in any way (see page 40 for details of how to do this).



■ **You can import *Neochrome* screens into *Flair Paint* with ease**

■ **The zoom feature allows fine editing of detail**



■ ***Flair Paint*'s the cat's whiskers**

THE COMPLETE PROGRAM

After playing around with our exclusive demo, we're quite sure you'll come to the same conclusion as we did; *Flair Paint* is quite simply the best paint package yet to see the light of day on the ST.

You can buy the complete program, which supports all the major ST file formats (NEO, DEGAS, IMG, etc) and works in both high and low resolution modes, for only £34.95 from Database Software. Database can be contacted on 051-3572961.

■ ***BootIntro* in action. Just enter the title and the scroll text and then select show to view the final intro.**

sage has been written, just reboot and the scrolly message will pop up every time you boot.

GETTING GOING

You can load *Boot Intro* by double clicking on the BOOTINTRO icon on the Workbench. Full instructions (in both English and German!) are included within the BOOTINTRO drawer.

■ **The finished intro. The blurred bit is the scrolling message!**

FORMAT WARNING!!!

Boot Intro directly modifies the boot block of a disk and therefore the program should not be used on disks that use custom boot blocks. Nearly all commercial games utilise the boot block to load and therefore you should never write over these special boot blocks or the game will fail to work.

ST

SPRITE ST

PROGRAM: BY C. GREEN
MACHINE: ALL COLOUR STS
FILES: SPRITEST.PRG, SPRITEST.DOC, BITS.DAT

Just take a look around at the vast number of games on both ST and Amiga and by far the most widely used graphic technique used is the animated sprite. The quality of animated sprites can either make or break a game and if both the animation and definition of a sprite is right, the results can be very impressive indeed; just take a look at games such as *Blood Money* for a very vivid example!

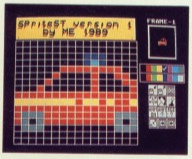
As you've probably already guessed, the cover disk program *Sprite ST* is a very powerful tool designed to enable you to easily produce animated sprites to incorporate into your games and other utilities. Features offered by *SpriteST* include:

■ Massive sprites. Sprites of up to 32 by 32 pixels can be easily created which utilise the full 16 colours available in the ST's low resolution mode.

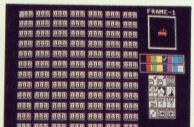
■ Extra large animations. With *SpriteST*, you can design animated sprites that are made up of up to 128 frames and then string them together into a sequence of over 140 events.

■ Usable in all languages. Sprite designers for ST BASIC are all very well but what happens if you're an assembler programmer? Luckily, the *SpriteST* file format is explained in considerable depth and therefore incorporating sprites into your programs is very simple indeed.

The current version of *SpriteST* will only save and load its files from the top directory of a disk (A: or B:), even if you try



■ ***SpriteST* editing an animated sprite.**



■ **The animation control screen. Enter the frame numbers in the order that they are displayed and *SpriteST* will do the rest.**

entering a sub-directory within the program's file selector.

GETTING GOING

You can load *SpriteST* by double clicking on the SPRITEST.PRG icon on the desktop. Full instructions are available within the SPRITEST folder.

AMIGA

TUNNEL

PROGRAM: PUBLIC DOMAIN
MACHINE: ALL AMIGAS
FILES: TUNNEL, TUNNEL.DOC

If you're expecting a description of *Tunnel*, then you're going to be disappointed as we're keeping our mouths firmly shut. *Tunnel* is another one of those 'fun' programs that occasionally sneaks onto the *Format* disk and, as ever, the best way to find out what it does is to load it yourself!

Format Warning! *Tunnel* has already claimed the sanity of at least one member of the *Format* team (no names though, nnuk nnuk!) due to over exposure. Darkened glasses are an absolute necessity!

GETTING GOING

You can load *Tunnel* by double clicking on the TUNNEL icon on the Workbench. Instructions (do you really need instructions?) are available in the TUNNEL drawer.

ST

ZAP ST

PROGRAM: BY R. HUGHES
MACHINE: ALL COLOUR STS
FILES: ZAPST.PRG, ZAPST.DOC

Do you remember the classic Amiga file editor, *NewZAP*, that we featured on our cover disk number nine? Unfortunately, the only complaint from an ST user's point of view was that is wasn't really of any great use to them.

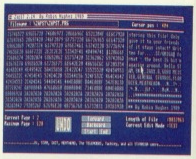
It doesn't take a brain the size of a planet to guess that *ZapST* is the ST version of that classic tool. But unlike most conversions, *ZapST* looks so much like the original that you could be forgiven for thinking that is was actually running on an Amiga!

ZapST is a editor designed to allow you to edit binary files. For example, if you were writing a program in a language such as GFA BASIC and you had just compiled it only to find out that you had made a spelling mistake in a particular item of text, using *ZapST*, you could change it without having to recompile from scratch.

GETTING GOING

You can load *ZapST* by double clicking on the ZAPST.PRG icon on the Desktop. Full instructions are available within the ZAPST folder.

ZapST looks so like the Amiga original, that it even uses pull-down menus. If you've never used an Amiga before, you may end up



■ ***ZapST* in action. Here, *ZapST* is editing itself.**

being rather lost.

To access the pull-down menus, you must first press the right mouse button and the screen title bar will change. Now, while keeping the right mouse button depressed, move the mouse pointer up to the FILE option and a menu will drop down. All you now have to do is to click the left mouse button on the menu option that you require and you're away. The other two options, GOTO and SEARCH will not function until you have loaded a file.

ST

TYPIST

PROGRAM: BY G. NEAL
MACHINE: ALL COLOUR STS
FILES: TYPIST.PRG, TYPIST.DOC, HD

Learning to touch-type can be a painful and very frustrating experience. If you are a member of the common 'hunt and peck' school, changing the habit of a lifetime can be hard work. How can you ease this pain? Oh you are so clever, *Typist* is a program that

HOME TYPIST
PLACE YOUR FINGERS IN THE 'HOME' POSITION, YOUR RIGHT THUMB WILL PRESS THE SPACE BAR
Q W E R T
Y U I O P
SPACE BAR
PRESS ANY KEY TO CONTINUE

■ **Teach yourself touch typing with ease.**

will make the transition almost painless.

Typist is a program designed to teach you how to touch-type using the traditional 'home keys' technique. The program will take you through various exercises which are designed to aid the development of your touch-typing skills.

GETTING GOING

You can load *Typist* by double clicking on the TYPIST.PRG icon on the Desktop. Full instructions are available within the TYPIST folder.

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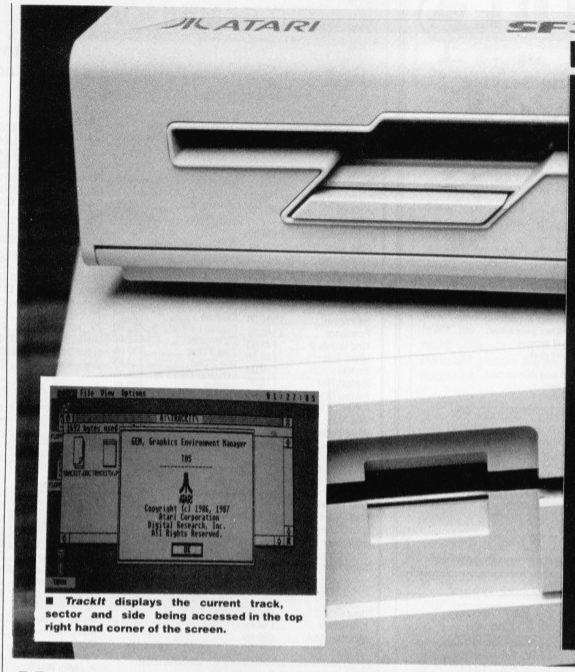

■ *TrackIt* displays the current track, sector and side being accessed in the top right hand corner of the screen.

ST

TRACK IT

PROGRAM: BY A. HOURIHANE
MACHINE: ALL STS
FILES: TRACKITH.PRG, TRACKITM.PRG, *TRACKIT*.DOC

If you've seen any of the latest add-on disk drives for the ST and Amiga, you may have noticed that the latest 'fashion accessory' for every street-wise disk drive is an LED display that shows the current track being read. All very nice indeed, but what happens if you've already bought a second drive or just can't afford the relatively high cost of such luxuries? Use *TrackIt* of course!

TrackIt is a very handy little program that displays the current track, sector and side being accessed every time the machine reads or writes a file to a disk in the ST's internal drive (A:). Just load the program and that's it; every disk access thereafter will be displayed by *TrackIt*.

GETTING GOING

There are two versions of *TrackIt* included on the cover disk, one for colour users and another for those of you with glorious mono. To load *TrackIt*, just double click on the appropriate version of *TrackIt* for your machine (TRACKITM.PRG for colour and TRACKITH.PRG for mono). Full instructions are available within the TRACKIT folder.

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Access

HOW TO USE YOUR DISK

The ST Amiga Format *cover disk is in a special format which can be read by both the ST and Amiga. Even if you are a seasoned computer user, please read these instructions carefully or you could damage your copy of it.*

The first thing you must do is make a backup copy of the disk. Because of the special format, the normal disk-to-disk copying methods, as recommended in both the ST and Amiga manuals, won't work. Instead you will need to format a disk and copy the files individually. Don't panic, this isn't at all difficult.

ON THE S T

Instructions for a single drive machine.

1. Take a blank disk and format it in the usual way.
2. With the blank disk still in the drive, double click on the A: drive icon to open up the (blank) contents window.
3. Now drag the icon for drive B: into the open window of disk A. This will copy all the files one by one off of the master disk onto your new disk. Make sure that the master *ST Amiga Format* disk is write protected (the sliding tab should be back so the hole is open) and put it in the disk drive when asked for drive B.
4. You will now be prompted at various times to insert disk A and disk B while copying takes place. There will be a lot of swapping to do on a single drive ST!

Note that our special cover disk contains 30K more files than will fit on a standard single-sided ST disk. If you own an old 520, you'll have to be selective and copy only the files you want.

ON THE AMIGA

Instructions for a single drive A500.

1. Start your Amiga up with your normal Workbench disk.
2. Take a blank disk and initialise it in the normal way.
3. Now enter the CLI, by double clicking on the CLI icon that is in your System drawer on a standard Workbench disk. Once the CLI window pops up, stretch it to full size using the window sizing gadgets at the bottom right hand corner of the CLI window.
4. Now enter the following CLI commands to set up our working environment (remember to press <RETURN> after each):

```
MAKEDIR RAM:C
COPY C:COPY|DIR|DELETE|MAKEDIR RAM:C
COPY C:RELABEL|INSTALL RAM:C
PATH RAM:C ADD
PROTECT RAM:C RWE
PROTECT RAM:C/COPY RWE
PROTECT RAM:C/DIR RWE
PROTECT RAM:C/DELETE RWE
PROTECT RAM:C/MAKEDIR RWE
PROTECT RAM:C/RELABEL RWE
PROTECT RAM:C/INSTALL RWE
```

5. Once you have entered the commands and the drive light has gone out, take out your Workbench disk and put your *ST Amiga Format* master disk in the internal drive (DF0:). To start the copying process, enter the following CLI command:

```
COPY DF0:#? RAM: <Press RETURN>
```

6. During copying, the machine will display a list of the files being copied. Once copying has finished, remove your cover disk and insert your freshly formatted blank disk into the internal drive and enter the following commands:

```
COPY RAM:#? DF0: <Press RETURN>
DELETE RAM:#? <Press RETURN>
```

7. That's now the top level of your cover disk successfully copied. The next step is rather more complicated. Firstly, remove your copy disk and insert our cover disk into the internal drive and enter the following:

```
DIR DF0: OPT D <Press RETURN>
```

The Amiga should then display a list of all the directories on your cover disk which will look something like the following:

```
FRED (dir)
s (dir)
devs (dir)
demo (dir)
```

You should now write down this list onto a piece of paper (the '(dir)' extension on each is not needed).

8. With your cover disk in the internal drive, each directory that was listed has to be copied individually from your cover disk onto your copy disk. For the sake of example, if our cover disk contained a directory called 'FRED', you would enter the following commands:

```
COPY DF0:FRED ALL RAM: <Press RETURN>
```

Now remove our cover disk and insert your destination disk and enter the following:

```
MAKEDIR DF0:FRED <Press RETURN>
COPY RAM: ALL DF0:FRED <Press RETURN>
DELETE RAM:#? ALL <Press RETURN>
```

9. Now repeat stage 8 for every directory on your cover disk master (In the CLI commands above, replace each instance of the word 'FRED' with the name of the directory to be copied). Once all directories are copied, your *ST Amiga Format* cover disk will have been successfully copied
10. The final step in backing up your cover disk is to give it the same name as our cover disk and make it directly bootable using the following commands:

```
RELABEL DF0: NAME "cover disk#12" <Press RETURN>
INSTALL DF0: <Press RETURN>
```

USING THE PROGRAMS

All the programs on the cover disk have been set up so that they are as easy to use as is possible. If you do have problems with a program, full instructions on loading and running a program are included in the disk pages and these should get you up and running. If you still have problems, read the documentation file (.DOC) that is included with every program.

ON THE ST

To display the contents of a program's documentation file, double click on its icon and a dialog box will pop up which includes an option to allow you to display the file's contents on the screen. Select 'SCREEN' and the file will be displayed.

ON THE AMIGA

To display a documentation file on the Amiga, just double click on the appropriate .DOC file to be viewed and a window will open and the file's contents will be displayed. Pressing the space bar will advance a page at a time.

COPYING THE DISK

Unless specifically stated the programs on the cover disk are not public domain and the copyright remains with the author. Selling these programs without the authors' permission is against the laws of copyright and offenders will be hit with a big stick.

HAVING TROUBLE WITH THE DISK?

We have done our best to check that the programs on this month's disk are simple to use, error free and have no known viruses. However, we cannot answer telephone queries on using the software, and we cannot accept liability for any consequences of using the programs.

If your *ST Amiga Format* disk is faulty – and out of tens of thousands duplicated some are bound to be – you should send it back by June 15 for a free replacement to:

***ST AMIGA FORMAT* JUNE DISK, DISCOPY LABS, 20 OSYTH CLOSE, BRACKMILLS, NORTHAMPTON NN4 ODY.**

Be part of the action

at the

ATARI COMPUTER SHOW

Alexandra Palace, Wood Green, London N22
Friday to Sunday, June 23 to 25, 1989
Fri & Sat: 10am – 6pm,
Sun: 10am – 4pm

The Atari Computer Show is back – with many new products and developments. Atari has grown to be one of the major players in the computer world, supported by an incredible wealth of top quality applications, games and utilities – all on view at this show.

MIDI

All the latest hardware and software in the rapidly expanding scene of micro music will be on display, including keyboards, samplers, sequencers and professional studio software.

With an Atari/Midi setup you can produce top-quality music, quickly and simply – editing out mistakes in a way that's impossible with live recordings. So if you're in any way interested in making music with your micro this is the place to come to find out all about it.

CAD

Computer Aided Design has grown to become one of the most important uses for modern computers. With a CAD system you can design houses, cars and electronic circuits – in a fraction of the time it would take you with pen and paper.

With the high speed and powerful graphics of Atari micros it's hardly surprising that bigger and better CAD programs are pushing back the frontiers all the time.

And only at the Atari Computer Show can you see all the latest systems under one roof.

BUSINESS

Many companies will be demonstrating their latest software and hardware, specially designed to release the full business potential of Atari computers.

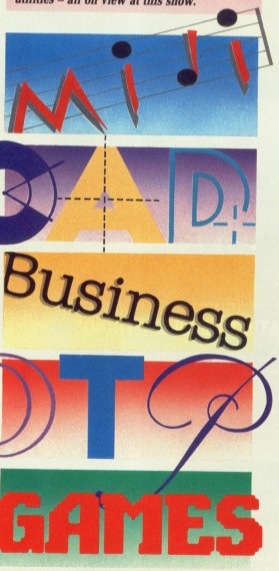
As well as products for the 8-bit and ST, you'll be able to try out applications for the powerful Atari PC compatible series.

And you'll also be able to get expert advice from professionals.

DTP

The art of combining text and pictures is big business nowadays because, with a low-cost DTP program, you can create anything from a club newsletter to a monthly magazine or book.

At the show you'll be able to try out the latest scanners, digitisers and super-fast programs, and get a first-hand glimpse at the way DTP is set to develop in the future.



GAMES

Atari computers are renowned for their ability to run fast-action arcade-quality games.

The range of new software on show will demonstrate how the power of these machines is continually being stretched, producing faster and even more addictive games with superb graphics.

The winning entry in the STOS Gameswriter of the Year Award will be revealed, and several new exciting STOS accessories will be shown for the first time.

If you're a keen game player, you'll find there's so much on offer at the show – you're guaranteed a real treat!

DON'T MISS IT

So for a great day out – whether you want to see what the future holds for Atari computer users, take advantage of the bargains on offer or get advice on specific applications – the Atari Computer Show is the place to go.

And if you send in the coupon now, you'll save £1 off the price of a single ticket!

SPECIAL OFFER

For the first time we are now offering a family ticket for just £11, allowing entry for two adults and two children. So you can save up to £6 off the usual entry price!

How To Get There

Alexandra Palace is so easy to get to by car, rail, underground or bus. It has its own British Rail station, just nine minutes away from King's Cross, and there's a free bus service shuttling between station and show every 10 minutes.

If you're travelling by road, the show is only 15 minutes away from Junction 25 on the M25. Car parking is free.

DATABASE EXHIBITIONS

ADVANCE TICKET ORDER

POST TO: ***Atari Computer Show Tickets, Database Exhibitions, PO Box 2, Ellesmere Port, South Wirral L65 3EA.***

Please supply:

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INSTRUMENTAL CHANGES

WHAT'S THIS CRAZY THING?

The potential for computer/MIDI control of musical instruments is almost unlimited; so much so that many musicians have had customised controllers manufactured for them.

Laser harp – perhaps the most famous example is the harp played by Bernard Szajner and used by Jean Michel Jarre at the infamous 'Rendezvous with Bankruptcy' Docklands concert last year. This works by translating the point at which a laser beam is broken by the hand, into MIDI pitch data. It's not too practical, but looks great!

Ultrasonic harp – the Ultraschallharfe is a more practical instrument designed by German New Age musician Hubert Bognermayr. It too uses lasers, but only as visual reference points for the musician. The real work is done by ultrasonic beams between the lasers, which detect the position and velocity of your hands and translate into MIDI data to drive a Fairlight. The harp has been used on stage in Austria, and may well appear in a performance of Bognermayr's Blue Chip Orchestra in this country next year.

Airdrums – manufactured by Palmtree, the Airdrums consist of a pair of hand-held tubes containing motion detectors. A control panel converts movements into MIDI note and velocity messages; so you just connect them to a drum machine and

shake 'em about for whacky percussion sounds. Kerazeee...

Soundbeam – even whackier is the Soundbeam, from EMS, the ancient UK company responsible for the classic VCS3 synth and vocoders. The Soundbeam is a motion-to-MIDI detector; the idea is to move around inside the ultrasonic field and generate MIDI signals. Kraftwerk have bought one... Jean-Michel has bought one... but will Joe Bloggs ever buy one?

So ya wanna play funky music or rock and roll? There's a huge range of inexpensive, entertaining MIDI hardware to let you make great music whatever your budget, your musical tastes or your musical ability. CHRIS JENKINS plays a medley of exotic MIDI instruments.

Synthesisers aren't the only things that you can connect to the computer via MIDI; there are all kinds of MIDI controllers – guitars, wind instruments, drums, microphones, even completely new types of instruments with which you can program your computer/MIDI system.

MIDI is the digital information standard, introduced almost five years ago, which lets you treat music like a word-processed document. Using a suitable MIDI software package and a MIDI controller – usually, but not always, a keyboard – you can record musical 'events' with the computer, edit them to your exact needs, and have the computer replay them precisely. There are dozens of MIDI music packages for the ST and Amiga; some of them, like *Steinberg Pro-24, C-Lab Creator* and *Hybrid Arts MIDITrack*, are used in top studios all over the world. Less expensive packages like *Dr T's KCS, Steinberg Twelve* and *Hybrid Arts Edit Track* are within the budget of most home musicians.

Evenlode Soundworks on 0993 89228 can sort you out with a copy of *Pro-12* or *Pro-24*. MCM (01-724 4104), meanwhile, should be able to supply with any of the other products mentioned

The ST, of course, comes with MIDI sockets built-in. The Amiga requires an additional MIDI interface. Probably the best buy on the market is Datel's (0782 744707) MIDI Master, which offers one IN, three OUTs and a THRU socket, and a high degree of software compatibility for £39.95. It's available in different versions for the A500, A1000 and A2000.

But that's enough about MIDI.

HOT AIR

The Digigram MIDI-Mic – imported by organ manufacturers Farfisa – is a hand-held pitch-to-MIDI convertor which allows singers (or for that matter players of any monophonic instrument) to control MIDI equipment. Sleek, black and futuristic, the MIDI-Mic incorporates a small condenser microphone which picks up the

sound of your voice and attempts to convert it into a MIDI pitch signal. The soft-touch controls on the head allow you to set the MIDI channel, pickup sensitivity, velocity response, octave and so on. Then it's your job to sing as clearly as possible. £199 buys you the instrument.

GOING MENTAL

A mind-to-MIDI convertor has been the subject of endless music paper April Fool stunts, but would nevertheless be an awesome device; just plug into your head and think your tunes! Someone, somewhere, is probably working on it right now...

SOUND YOUR FUNKY HORN

Until fairly recently, the only practical wind synthesiser was the Lyricon. The advent of MIDI has changed all this; now you can get into wind synthesis for less than £100!

Casio DH100/800 – the DH100 and DH800 horns may look like toys, but they've been used by bands such as Erasure both on stage and in the studio. The MIDI horns are played like recorders – you blow into the mouthpiece and finger the keys as you would a recorder. Although you can flick a switch and do away with the need for any hot air. Both horns have a number of monophonic preset electronic tones such as flute, sax, and clarinet. These can be heard through the built-in speaker or through an external amplifier. You can also plug them into an external MIDI module for amazingly realistic wind-synth noises. By using 'tonguing', vibrato and tremolo techniques on the mouthpiece, you can create effects impossible to play on a keyboard – and, of course, your ST or Amiga-based MIDI sequencer package can record all this data for later use.

Yamaha WX7 – this evil-looking implement is now available at a discount price of around £299. Though it doesn't make any sound itself, the instrument works by combining its MIDI output with the breath-control signals recognised by most Yamaha synths since the DX7. The WX7 is played like a saxophone, and has a six-octave transposition range using thumb-keys.

The sax-like mouthpiece has a plastic 'reed'; the key layout is sax-like too. The response can be tailored to your individual playing style by adjusting switches inside the barrel. There's a very sophisticated MIDI spec which is particularly suited to Yamaha's TX81Z multi-timbral FM tone module.

■ **Casio DG20 – this futuristic guitar-style controller is in many ways equivalent to the MIDI horns. It isn't a genuine guitar as the strings aren't tensioned or tuned, so you can't create effects like string bending. The guitar generates notes by detecting the positions of your fingers on the fretboard.**

The DG20 has 20 six-note polyphonic voices including acoustic and electric guitars, harp, trumpet and organ. These can be heard through the built-in speaker or sent to an amplifier. Some of them have built-in sustain, reverb and flanging effects added. In addition, the DG20 has a rhythm generator with twelve PCM-sampled preset rhythms, synchro-start and fill-in. There's also four drum pads which trigger bass, snare, tom and cymbal sounds.

The MIDI OUT socket lets you transmit note information, patch changes (using the rhythm keys), MIDI clock and portamento. Using a multi-timbral module you can assign a different synth voice to each string. By using your computer's software sequencer it is possible to record six different tracks at once – each on a different MIDI channel! Cost of the DG20 is around £250.

■ **Casio MG500/510 – for more serious guitarists, such as Vince Clarke of Erasure (he gets about a bit, doesn't he?), there's a genuine solid-bodied electric MIDI guitar, the MG500/510. The 500 is a traditional shape whilt the 510 is more futuristic. Each has a tremolo arm and three electric pick-ups with the usual range of guitar controls. An extra panel of MIDI controls offers a volume knob, a guitar/MIDI/both output selector, a MIDI octave selector and a mode switch which decides how the guitar reacts to string bending. One irritating aspect of the MG500/510's design is that to change MIDI patch you have to set the mode switch to a third position, then play a note, which determines the new patch (0 to 95). This system is fairly ghastly, but by eliminating an LED display or numeric keypad it helps to keep the price down to a reasonable £549.**

DIG THAT CRAZY BEAT

There's nothing quite so satisfying as a good bash at a drum kit – unfortunately, real kits are big, noisy and awkward to set up. Not so with the MIDI equivalents.

Cheetah DP5/MD8 – Cheetah's DP5 Powerplay kit costs £159.95, and consists of five full-size electronic drum pads and a strong tubular steel frame. As they stand, the pads don't make any sound – hitting them just produces a velocity-responsive trigger which can activate sounds from drum modules such as those manufactured by Simmons.

A trigger-to-MIDI convertor – for instance, Casio's DZ-1 – will let the Cheetah DP5 drive any MIDI module like the Roland MT32 or D110.

You can connect the DP5 to an interface box for use with Cheetah's MD8 digital drum machine. At £149.95 this is the cheapest on the market; it offers eight sampled sounds which can be exchanged using special data tapes.

Yamaha DD5 – another excellent budget MIDI drum module is the £80 DD5 from Yamaha. This is marketed by the home keyboard division, but has a lot to offer professional musicians – so much so that it was used by production team Coldcut on hits like Stop This Crazy Thing, The Only Way is Up and People Hold On.

The DD5 features four velocity-sensitive MIDI pads, which are designed to be hit with sticks rather than fingers. There are 12 PCM-sampled drum sounds available: bass, snare, hi-hat open and closed, toms and clap. Any sound can be assigned to any pad, and either played through the internal speaker or output to an amplifier.

The DD5 also has 30 built-in preset patterns, covering all sorts of styles including rock, disco, reggae, heavy metal, bossa-nova and waltz.

The DD5 really comes into its own when you use it as a MIDI controller for creating your own patterns. Linked through its MIDI OUT socket to a software sequencer running on your ST or Amiga, it can be used to build up complex rhythm patterns which can then be played back on your synths, samplers or drum machines (not, unfortunately, on the DD5, which lacks a MIDI IN!). At around £80, it makes the £450 Roland Octopad – which has eight pads and a much more complex MIDI spec, but no built-in sounds – look a bit silly.

KEYS PLEASE

Even if you plan to use a MIDI guitar, horn, drums or whatever as your main controller, you'll probably need a keyboard at some stage. In the same way that you can save money by buying keyboardless synth modules, you can also save by buying soundless MIDI master keyboards.

There are two main types; 'mother' keyboards designed largely for studio use and 'remote' keyboards for stage use.

Cheetah MK7VA – this is the clear budget winner in the mother keyboard market. It offers seven octaves of velocity, aftertouch and release-sensitive full-size keys, four key-assignable playing zones each with its own MIDI OUT socket, MIDI IN and THROUGH, LCD display, pitch bend and programmable modulation wheels, and eight performance parameter memories. All this for an unbelievable £399.

Casio AZ1 – loads of appearances in pop videos, and demand from musicians, have prompted Casio to revive it at a reasonable £275 (while stocks last!). The best of the remote keyboards. The AZ1 has battery or mains transformer power, and is styled in eye-catching white with a guitar-type 'neck' and head. It's slung over the shoulder on a guitar strap and played with one hand, while the other hand operates the performance controls.

There are three-and-a-half octaves of full-sized keys, two control wheels, portamento and sustain buttons, a programmable parameter slider and a bank of patch change buttons. It's velocity and aftertouch sensitive, and can send out MIDI signals on two programmable channels simultaneously. A great toy for style-conscious musicians.■

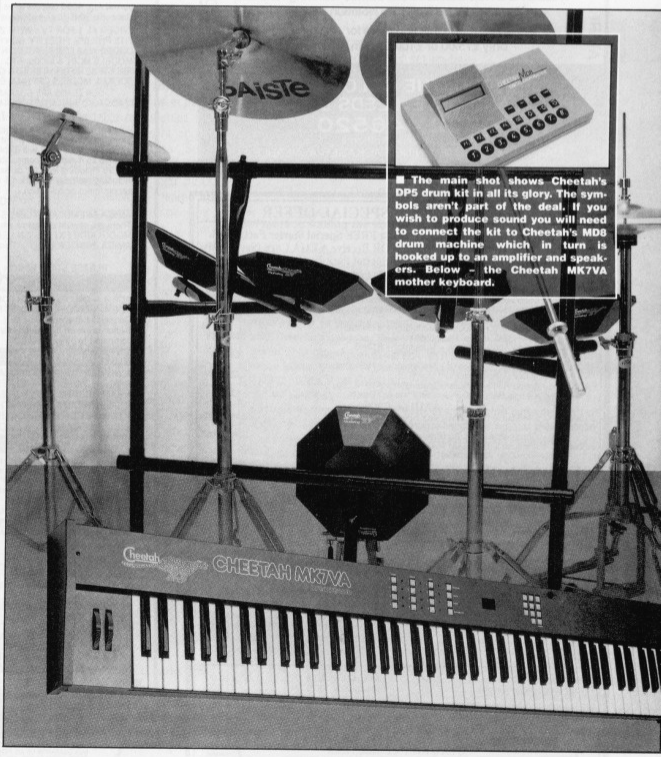
MIDI FACT SHEET

Instrument	£	From
DH100 Digital Horn	99	Casio
DH800 Digital Horn	129	Casio
WX7 Flute	299	Yamaha
DG20 MIDI Guitar	250	Casio
MG500 MIDI Guitar	549	Casio
DP5 Drum Kit	160	Cheetah
MD8 Drum Machine	150	Cheetah
DD5 Drum Pads	80	Yamaha
Digigram MIDI Mic	199	Farfasia
MK7VA Mother Keyb'd	399	Cheetah
AZ1 Remote Keyb'd	299	Casio
TQ5 Module	399	Yamaha

Manufacturers: Casio 01-450 9131; Yamaha 0908 71771; Cheetah 0222 22190; Farfasia 0282 35431.

THANKS

Sound International of 5 Monmouth Place, Bath, BA1 2AU (0225 319979) for loaning us a Casio Digital Horn, Yamaha SHS2000 and a Farfasia Midi Mic. Duck, Son and Pinker of Pulteney Bridge, Bath (0225 65975) for lending us a Yamaha WX7, Casio PG310, Yamaha TX81Z, Yamaha TQ5, Casio VZ10M and a Casio AZ1.



■ **The main shot shows Cheetah's DP5 drum kit in all its glory. The symbols aren't part of the deal. If you wish to produce sound you will need to connect the kit to Cheetah's MD8 drum machine which in turn is hooked up to an amplifier and speakers. Below – the Cheetah MK7VA mother keyboard.**

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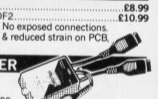

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LEARNING TO COUNT AGAIN

This month's episode in the teach-yourself-assembler saga looks at subroutines, negative numbers and simple arithmetic. Your personal microprocessing guide is TUBBY FOSTER

Last month we looked at how the DBRA (Decrement and BRAnch) instruction can be used to repeat a piece of code in a simple loop. Often, however, we need to repeat a section of code intermittently. For instance, last month's screen clearing routine might be required in several different places within a larger program. This can be done without having to repeat the code by making it a subroutine, as in Figure 1.

Two additions to the code make it a subroutine: the label 'Clear_Screen' which you use to identify it when it is run with an instruction like 'BSR Clear_Screen' and the 'RTS' instruction which indicates the end of the subroutine. BSR is short for Branch to SubRoutine and RTS is short for Return from SubRoutine. A program may then run (or 'call') the subroutine at any time simply by using 'BSR label'.

In fact a subroutine may even call itself; this is called 'recursion', and thankfully is only rarely done!

Subroutines are normally placed after the main program. Always add comments to give a brief description of what the routine does, details of any variables (parameters) which need to be passed to the routine, a list of registers whose contents are corrupted and details of any parameters returned to the main program, either in registers or in RAM. This information will be valuable when, long after the code was originally written, you want to reuse a routine.

PARAMETER PASSING

To pass parameters to a subroutine you have to make sure that any variables that the routine expects to be in the registers, within a table of variables or on the stack are indeed present and correct. For example, 'Clear_Screen' expects A5 to point to the base address of the screen, if it didn't then 32,000 bytes of memory would be cleared from wherever A5 happened to be pointing at the time – possibly disastrous!. Some subroutines don't not need any parameters.

It's worth considering more closely what goes on during a subroutine call because it should help you understand what the stack is and how it works.

STACK 'EM UP

The stack is a section of memory which the computer uses as a kind of notepad. Data is put on the stack ('pushed' in the jargon) and can be retrieved later. The memory which is used for the stack is pointed to by register A7, known, logically enough, as the stack pointer. In fact you can use 'SP' instead of A7 in instructions if you wish.

When a subroutine is called the address of the instruction following 'BSR label' is written onto the stack so that the processor knows where to return at the end of the call. The return address is said to be 'on the top' of the stack. At the end of a subroutine RTS reads the address from the top of the stack (a process techies call 'popping'). Whenever information is pushed onto the stack the stack pointer is 'pre-decremented' making it point to a lower memory location before writing the data. Popping information off the stack is accompanied by 'post-incrementing' A7, increasing the pointer after the information has been removed.

Registers D0, D1 and A0 are smashed by 'Clear_Screen'. If those registers held important information from the main program their contents could be preserved by putting them on the stack, then reloading them after the subroutine has finished, as in figure 2.

It's important to use pre-decrement and post-increment addressing, otherwise you'll end up overwriting information on the stack.

Because D0 is the first register to be pushed onto the stack it must be the last register to be popped off. Clearly the stack pointer A7 must be used with care. By the way, whenever an ST or Amiga program is run, A7 is set up by

```
* Subroutine to clear the screen pointed to by A5. *
D0/D1/A0 smashed.
Clear_Screen    MOVEA.L A5,A0 pointer to base of screen
                MOVEQ #0,D0
                MOVE #32000/4-1,D1 counter for longwords
clr_screen_lp
                MOVE.L D0,(A0)+
                DBRA D1,clr_screen_lp
```

■ **Figure 1. The Screen Clear subroutine**

```
MOVE.L D0,-(A7) preserve registers
MOVE.L D1,-(A7)
MOVE.L A0,-(A7)
BSR Clear_Screen
MOVEA.L (A7)+,A0 restore registers
MOVE.L (A7)+,D1
MOVE.L (A7)+,D0
```

■ **Figure 2. Calling the subroutine.**

DOCUMENTARY EVIDENCE

The degree to which programs are documented varies enormously. It is usual in academic or corporate environments to produce reams of documentation to enable anyone to understand, and therefore update, the code when the originators are long gone. This smacks of paranoia to me. It's the sort of thing that leads idiots to claim 'a good assembly language programmer can only produce eight lines of debugged code per day'.

In contrast, many games programmers provide virtually no documentation – this is tantamount to throwing code away since it's hard to reuse code when you've forgotten what it does!

I don't pretend to be perfect but here's how I document code and, of course, I recommend that you do it too. When you are writing code all the ideas are present in your mind: you know what's going on. Or at least you know what should be going on. This is the best time to write the odd note about a routine and annotate instructions. It's a big mistake to think you'll write down the instructions first then, when the code's fully debugged, it can be documented: this way it never gets documented.

I know, I know, you're different and can be relied upon to write the comments later; the trouble is there's always something more important to do. Get into the habit of writing comments when you write the instructions. It will soon become second nature and will pay off in the long run.

Comments should never describe what an instruction does from the processor's point of view. This is silly:

```
LEA 160(A0),A0 add 160 to A0
```

Comments should describe what is happening in terms of the application the instruction serves, like this:

```
LEA 160(A0),A0 next screen row
```

the operating system so that you can use it straight away.

Since there are 15 registers (D0 – D7 and A0 – A6) that may need to be saved on the stack at any one time the 68000 has a specific instruction for doing this: MOVEM (MOVE Multiple registers). This instruction saves words or longwords but not bytes.

The calling sequence in Figure 2 could be changed by using this command to:

```
MOVEM.L D0/D1/A0,-(A7)
BSR Clear_Screen
MOVEM.L (A7)+,D0/D1/A0
```

The register list in MOVEM must specify data registers before address registers in the order D0 to D7 then A0 through A6.

If registers are saved almost every time 'Clear_Screen' is called then it would make better sense to save program space and save them within the subroutine itself.

TWO AND TWO IS FOUR

The 68000 provides arithmetic instructions for addition, subtraction, multiplication and division.

Six addition instructions exist : ABCD, ADD, ADDA, ADDI, ADDQ and ADDX.

ABCD stands for Add Binary Coded Decimal numbers. Binary coded decimal (BCD) numbers have each nibble coding for a digit between zero and nine. A word, therefore, can hold the numbers 0000 to 9999. Although this convention seems attractive at first sight, there is little use for ABCD. In fact, it's best to forget all about it.

ADD is used to add together bytes, words or longs – however, at least one of the operands must be held in a data register.

ADDI (ADD Immediate data) is used to add immediate data bytes, words or longs to a data register or to somewhere in RAM addressed by the destination operand. For example, ADDI #72,56(A0) calculates the destination address by adding 56 to a copy of the contents of register A0 then adds 72 to the word found at that address (A0 is not affected by this instruction of course). Remember that the hash denotes immediate data.

ADDI.B and ADDI.W require a word of immediate data and ADDI.L requires a longword of immediate data. Since the ADDI opcode itself requires a word of machine code then overall ADDI.B/.W occupy four bytes of memory and ADDI.L occupies six bytes of memory. Fortunately the 68000 provides an add instruction, ADDQ, that only takes up two bytes. With this instruction the immediate data is restricted to range from one to eight although this may be added to bytes, words or longs. ADDQ stands for ADD Quick and is much faster than ADDI.

ADDA (ADD to Address register) is used to make an addition to an address register. ADDA, like all other instructions with an address register as a destination, doesn't allow byte-sized operation and sign-extends word data so the entire longword is affected (sign extension is explained in the box). Hence, 'ADDA #$42,A6' is interpreted by the 68000 as 'ADDA.L #$00000042,A6'. This is done internally in the processor so only one word of immediate data ($0042) appears in the machine code. Similarly 'ADDA #-73,A4' i.e. 'ADDA #$FFB7,A4' is interpreted as 'ADDA.L #$FFFFFFB7,A4' (the way the chip handles negative numbers is also explained in the box).

Virtually all 68000 instructions affect the condition flags. Hence, ADD, ADDI, ADDQ and ADDX all:

- Set Z if the result was zero (otherwise it is cleared).
- Set C and X if a carry occurs.
- Set V in an overflow occurs.
- Set N if the result is negative.

ADDA doesn't affect any flag.

SBCD, SUB, SUBA, SUBI, SUBQ and SUBX work in exactly the same way as the addition instructions, except, of course, they subtract.

YOUR COMPARE TONIGHT...

Suppose we need to test whether the number 67 is present in a data register. We could use:

```
SUB #67,D0
BEQ.S correct_number
```

This is a reasonable thing to do so long as the data in D0 is not needed later as it is changed by SUB #67,D0. You could get round this by adding 67 later, but that's a bit messy. To get round this the 68000 provides the compare instruction, CMP, which produces the condition flags as if you had subtracted the number, but leaves the data registers unchanged:

```
CMP #67,D0
BEQ.S correct_number
```

You can check the address registers' contents with CMPA, which works on words and longs only, of course.

CMPM (Ay)+,(Ax)+ compares memory bytes, words or longs via address register indirect with post-increment addressing. In other (English) words, an address register points to where the data may be found in memory, and is increased by 1, 2 or 3 (for .B, .W or .L) after the operation so it automatically points to the next data location in memory.

To multiply, the instruction:

```
MULU <ea>, Dn
```

takes the word from the effective address (<ea>) – D6 or 22(A0) for example – and multiplies it with the word contents of a data register storing the longword result in the data register. MULU takes no notice of the signs (ie, negative or positive) of the numbers it is multiplying, MULS is similar but operates on signed data.

DIVU and DIVS divide unsigned and signed data respectively. The longword in the destination data register is divided by the source word and the resulting quotient is placed in the lower word of the destination register. The remainder appears in the higher word of the destination register. Be sure that the denominator (source operand) is not zero else a 'divide by zero exception' will occur – crash!!

Multiplies take a lot of processor time and have a book handy while the chip executes a divide, but it's a lot easier than programming it longhand.

The cover disk holds a file called SOURCE3.S which can be assembled to illustrate simple arithmetic. The example programs from last month which we left off the disk are also included.

SIGNING ON

The most phenomenally wonderful number system ever invented is known as two's complement. This simple system is used by virtually all computers. Negative numbers are represented by setting their most significant bit (MSBit). A clear MSBit indicates a positive number. For bytes bit 7 is the sign bit, for words it is bit 15 and for longwords it is 31.

To convert a positive number to its negative counterpart subtract one and invert each bit:

0	0	0	0	0	1	1		3
0	0	0	0	0	1	0		-1
1	1	1	1	1	0	1		invert

Hence –3 decimal can be represented by the byte $FD. The 68000 instruction 'NEG' (.B, .W, .L) will perform the negation process for you.

To see why $FD equals –3 try adding three – sure enough the answer is zero! Well, nearly. In fact the 1 produced as bit 8 cannot fit into a byte and exists as a carry. This is ignored in two's complement arithmetic. Hence, we are left with zero.

The largest positive number available in a byte is $7F because anything greater would have the MSBit set. The most negative number is $80. So bytes can hold 256 unsigned numbers from 0 to 255 inclusive or 256 two's complement signed numbers from –128 to 127. Similarly, unsigned words range from 0 to $FFFF (0 to 65535 decimal) and signed words range from $8000 to $7FFF (-32768 to 32767).

If you want to convert a signed byte to a signed word then the byte must be sign-extended i.e. copy the sign bit (bit 7) to the MSByte of the word (bits 8 to 15). So $03 becomes $0003 and $FD becomes $FFFD. Similarly, for converting words to longwords bit 15 is copied across bits 16 to 31. So –3 is represented as $FFFFFFFD as a longword. The 68000 instructions EXT and EXT.L perform these operations.

How does a typical instruction such as ADD know whether the data involved is signed or unsigned? For example, if D0.W holds $E071 and D1.W holds $0466 will ADD D0,D1 produce (in decimal) 57457+1094 = 58551 or will it produce –8079+1094 = –6985? Well it doesn't matter. How can it not matter you say, surely 58,551 is rather different to –6,985? Wrong! In two's complement they are both identical – $E4B7.

It doesn't matter whether you think of data as being unsigned or signed as long as you use the two's complement representation all the time.

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Is your Workbench screen looking dull and lacking colour? Do you want 16-colour icons instead of boring old four? Then join GARY BARRETT with a copy of IconPaint

■ **A world at your finger tips with *IconPaint*.**

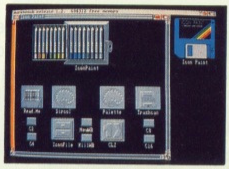
You must have noticed how many games, business packages and even the *Format* cover disk have customised icons on the Workbench. They aren't essential – the standard Amiga icons are fine – but after a while you get sick of looking at the same boring old icons sitting there on your Workbench. Admittedly your Workbench disk has got an icon designer on it too, called *IconEd*, but you can only draw in four colours. Many people will be satisfied with that, but if you can't live without 16-colour icons then *IconPaint* could be the thing for you.

DAWN OF THE ICONOCLAST

What can *IconPaint* do that *IconEd* can't you ask? Lots of things is the short answer, but they don't pay me to come up with glib answers like that. To reiterate, *IconEd* can only produce four colour icons, but *IconPaint* can produce them in two, four, eight and 16. Why should you bother with two colours? Because that way less space is taken up by the Workbench which give you more memory free for programs and applications that you want to use.

Also you can create the alternate icon which appears when the original icon is clicked on; a typical example of which is a drawer that slides open when you click on it. Both the normal icon and the alternate one can be created at the same time and are both visible simultaneously.

Icons can be created up to 320 by 100 pixels, approximately a quarter of the screen. Icons that size eat up a fair chunk of memory though, especially in 16 colours.



■ **Designing icons is simplicity itself. Both normal and alternate icons can be designed at the same time.**

IconPaint itself can be used to design the icons with no problems, but if you want a more powerful drawing tool you can use any art package that uses standard IFF format for its pictures or brushes. Both can be loaded into *IconPaint*, but with pictures you must make sure that the section of image that you want is in the top-left hand corner of the picture. A maximum of 16 colours can be used and ham and interlace are not supported.

THE PRICE IS RIGHT

One of the most important considerations in any product, especially one with such limited use as an icon designer, is price. Fortunately for *IconPaint* the price is no more than a typical game at around £20. Much more than that and it just wouldn't be worth the price, but as it stands it's priced just right.

It has some novelty value for making your disks look different, but after a while you'll grow bored of designing endless icons, and you'll also waste a lot of disk space with large multicoloured icons.

The people that will gain most benefit will be those that plan to release a product and want pretty icons on the Workbench and a few poor Amiga owners who just can't stand boring icons and have a craving for colour on their Workbench.

Strictly a product for the few then but well done nevertheless.

INTO THE CLI

CLI users will find that they have some new commands at their disposal which allow them to use their new icons on disks other than the *IconPaint* master disk.

Four of them simply alter the number of colours on the Workbench to 2, 4, 8 or 16. Quite a few files have to be moved to a disk if you want it to other than four colour Workbenches, but this has been made easier by a single command used directly from the CLI.

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performance

0 1 2 3 4 5

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for

- Both main and alternate icons can be designed at the same time.
- Brush and picture files from art packages can be loaded in.
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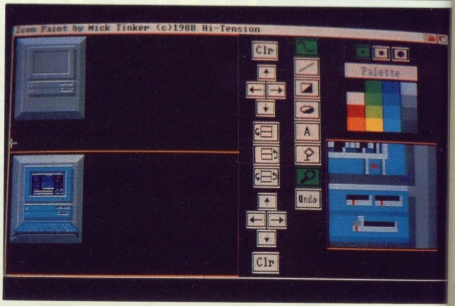

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LIFE BEGINS AT THE HOP

Constructing characters and moving them in mysterious ways is the name of the game this month in part three of MARK PICKAVANCE's animation tutorial.

Have you ever tried to draw Mickey Mouse? Easy, isn't it? If you are going to create many minutes of animation within a reasonable time scale then your subject must be easy to draw; this was the thinking behind the design of Mickey. Animators modified his shape and construction to be as simple as possible so that animation could be concentrated on.

Over the page you will see Mickey at various stages of completion, which might give you an idea of how to go about creating a character. To get some practice either copy the design or find yourself a suitable cartoon. The object of this exercise it to produce a still image, so you can use any paint package.

You only need eight colours so if you can get higher resolution by reducing your palette to eight colours then do so. The example was drawn in *Deluxe Paint* because it allows you the highest resolution and colour combination. Before Amiga owners get over-smug with having such efficient hardware (and software to exploit it), the original line graphic was created on a 1040 ST, using *Flair Paint* in high resolution monochrome.

HEAD AND SHOULDERS

That wasn't so difficult was it? The key to drawing Mickey is to get those initial circles the correct size and in the right place. Having an art package which can do arcs is an advantage. Always draw Mickey's head first. It is the dominant part of his persona and once you can get the head right you are 90% of the way there. Once, when asked how he could draw Bugs Bunny so easily, Chuck Jones said: "First I draw a carrot, then I attach a rabbit to it, then it's finished". Chuck wasn't being totally facetious; what he was trying to say was that all characters have a key component from which the rest of the design must relate. He found that by positioning the carrot – or the hand holding the carrot – the rest of Bugs fell into place.

There's one last thing to note about Mickey. Like almost all 'toons, Mickey has three fingers and a thumb. This is because Disney's animators could not draw four fingers and a thumb without making the hand look like a bunch of bananas. If they couldn't do it there's no point you attempting it.

MAKE YOUR MOVE

Last month we promised you more movement, so here goes with jumping, skipping and a double bounce walk. You can copy the designs into whatever software you find yourself most at ease with.

Just to prove that colour isn't everything, the jumping and skipping designs were painted in high resolution monochrome.

With a jump the entire body is treated as a bouncing ball. The arms give extra force to the action, projecting the character's weight in the desired direction.

The six drawings overleaf that make up this motion are designed to loop, so you could repeat them to get a series of jumps across the screen. Another exercise could involve making the take-off and landing points different heights, this would mean you compressing or expanding the number of frames depending on what you wanted. If you desired a 'jump down' you would need to add frames because the character has further to fall.

Below 'jumping' is 'skipping'. Skipping is not very different from jumping – in fact, it is jumping off one leg. The importance of this is that we very rarely jump with both legs simultaneously. You spring from one leg using the other as a counterbalance. Frame number three shows the key action. The bent leg has been accelerated from the point that it was removed from the ground. Between frame three and four it crosses the centre of balance. The resulting momentum carries the character off the ground. This is supported by the throwing of the arms into the air, giving additional upward force. The rest of the phases are concerned with maintain-

DUCK DOMINATION

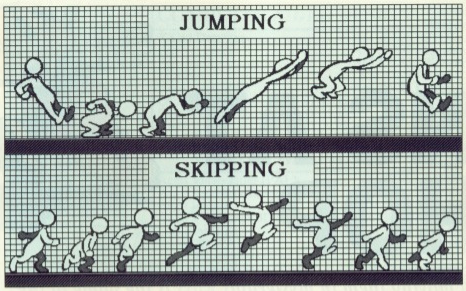
In 1938 Donald Duck had became more popular than Mickey Mouse. His more natural abilities to get angry, jealous and aggressive seemed to enable people to relate more easily to him. A writer for the *Los Angeles Times* said of Donald: "Being born in the midst of the late depression, Donald was a child of adversity and like so many of them, made his way by squawking. The duck was always mad. Mickey was the spirit of fun and light and good moral principle. I hate to say this, but the duck seems to have won!"

SUPPORTING CAST

Mickey could not play centre stage without some support from other characters. The first were Horace Horse-Collar and Clarabelle Cow in *The Plow Boy* (1929). Then came Pluto in *The Chain Gang* (1930), though he was not referred to as Pluto until 1931 in a film called *The Moose Hunt*. A year later Goofy appeared in *Mickey's Revue*. He was an instant success.

Goofy was designed and animated by Art Babbitt who, 50 years later, trained some of Richard Williams' animators (they created Roger Rabbit). Art said about his creation, "Goofy was the kind of character that thought very hard and long about everything that he did. And then he did it wrong!"

In 1934 Donald Duck made his first appearance. Originally he was much thinner than his figure of today. Though he did sport the sailor suit and cap which have been his trade mark every since. Quite why he was dressed like this, is difficult to ascertain. His first story involved harvesting corn and was called *The Wise Little Hen*.



ing balance for the landing and compression that follows. If you want to treat this as a skip then draw only the first seven frames and then mirror the limb positions so that your character skips alternatively on left and right legs.

Note: characters that skip are not usually associated with acts of violence.

ICE SKATING.

You may often want to have characters walking around the screen rather than walking on the spot. Game programmers and designers do not see this as a problem; they just shift the sprite a few pixels and leave it that. This often leads to 'ice skating' where the movement of the feet bears no relation to ground.

The simple way to deal with this is to use the heel of the foot in contact with the ground as a guide. Unless you are on ice or oil, a foot which is planted on the floor will remain in the same place until lifted. The problem with this is that virtually all animation packages move a sprite sequence by a set amount each frame. This is not what you want. The only solution is to position each frame by hand or use some way of off-setting each sprite by the correct amount.

Creators of games can build a data table of the correct offsets to make the walk look right, but this often conflicts with the requirements of the game's control. There is no simple answer.

WALT AND OSCAR

Some actors and directors have received an Oscar for their contribution to the art of motion pictures. Walt Disney was given a staggering 32. The most bizarre of these was the special award for *Snow White* – it was one large Oscar and seven little ones.

JUST PLANE CRAZY

Mickey Mouse first appeared in 1928. The design originated out of another 'toon, Oswald the Lucky Rabbit. He also underwent a name change from Mortimer to Mickey before the first film *Plane Crazy* was released. *Plane Crazy* was animated by one of the heroes of early animation, Ub Iwerks. He became famous not only for the quality of his animation but also the speed with which he worked. *Plane Crazy* was completed in under two weeks, Ub producing over 700 drawings a day.

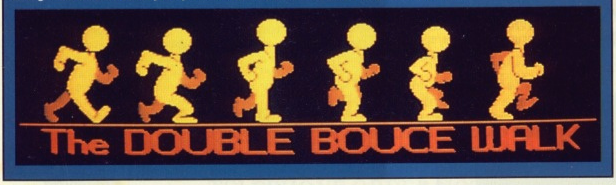
It was not until Mickey's third film, *Steamboat Willie*, that Mickey captured the public's affection. The change that made all the difference was sound. Walt had been inspired – after seeing *The Jazz Singer* – to halt production and adapt for audio. The *New York Times* thought the film an ingenious piece of work, and welcomed "a new cartoon character henceforth to be known as Mickey Mouse".

DOUBLE BOUNCE WALK

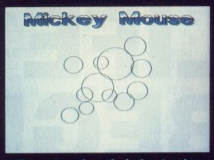
Previously you've been shown how to create a walk cycle. A standard variation on this is the double bounce walk. This is the technique Disney animators used to make Mickey's walk more expressive, giving him a more confident style by bouncing the head and body in the mid-stride.

The body dips more in frame 2 and comes up early in frame 3. The arms are much more expressive though not as active; they only move in the cross-over phases. The head bobs twice in the same time as one bob on a standard walk. Obviously you're viewing the action from the side – if viewed from the front the arms swing right across the body. The arms are held in a gestured position before moving into the opposing pose.

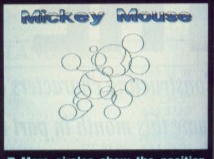
The hips counteract all this upper body movement, the greater the displacement of the arms, the more the hips must swing.



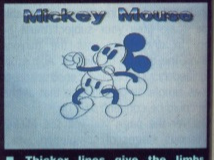
MAKING THE MICK



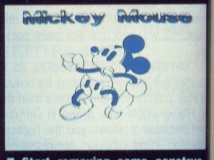
■ Draw a series of circles to show where the body, head and ears should lie.



■ More circles show the position of the feet and other less important features.

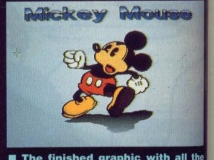


■ Thicker lines give the limbs more substance, as does filling parts of the head with colour.



■ Start removing some constructional lines and cleaning up the remaining ones.

■ Finish by rendering the graphic with flat colour. Flood fill makes this almostinsignificant.



■ The finished graphic with all the details and a shadow in place.

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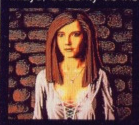
ST/AM 06

SILICON STIMULATION

Should sex games be branded 'over 18'? What about explicit animated demos? Do they break the Video Recordings Act? FORMAT investigates everything from sexist advertising to underground hardcore.

MUCKY MARKETING

Marketing folk stuck for a creative idea have always turned to simplistic sexist messages to sell their products – especially if those products are targetted at men. Advertisements, game inlays, celebrity tie-ins and – to some extent – game graphics, have all featured their fair share of the erotic. Admittedly, eight-bit computers weren't able to offer the detailed images possible with machines like the ST and Amiga, so the on-screen reality was often a let down when compared to the packaging. But that sort of thing never worries marketing folk...

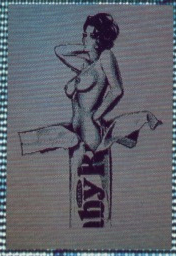


In the case of a straightforward disrobing game, the Page 3 possibilities are obvious – and a marketing person's dream. Not only can you play cards to see more of Maria Whittaker's over-ample charms on your computer screen, you can slobber over the prospects of doing so by studying Maria's form on the inlay.

Breasts and bodies can be used as a selling image in advertising for non-sexy games too. Maria's mammaries caused a bit of a storm (in a double-D cup no doubt) when they appeared in ads, inlay artwork and posters for Palace's *Barbarian*. (No-one saw fit to complain about the scantily-clad hunk who partnered Maria, though.)

And should the cost of hiring a set of personality breasts for a photoshoot proves beyond the marketing budget – or if the truly massive pair your creative director has in mind simply can't be found on a human chest, there's always the option of getting the airbrush artist out of the cupboard. Ever since man first doodled on the wall of his cave, artists (and a fair number of visual illiterates) have been exaggerating the proportions of the female form in the joint names of art and titillation. From *Game Over* (*I* and *II*) ads, through to *Defendor of the Crown*, creators of magazine advertising copy have taken the breast, switched on the airbrush compressor and inflated it beyond the anatomical limits of the real world.

Still, if that's what sells games...



■ **Digitisers are the standby of would-be pixel pornographers and poker game programmers. Placing 'traditional' glamour shots under a video camera is one route to sexy screens, but much of the public domain material has been lifted from videos. And isn't fit to print in a family computer magazine... On the left page – pop art choc bar and a sepia sensations on the ST. This page – more traditional Page 3-type girls displayed on the Amiga.**

POKER FOR STUDS

There's no tradition of strip backgammon or mucky Monopoly which is probably the only reason why digitised flesh has not, as yet, been used to jolly up tedious or inept gameplay in other board/cardgames. Every time a new strip poker game arrives in the offices of magazines for review, it is accompanied by a press release which twitters on endlessly about the cunning programming, the nifty algorithms and the all round intellect of the programming team responsible. This game plays an excellent game of poker, the releases insist. You could almost miss the fact that the main point of the game is to get the clothes off the back of some digitised lovely.

Sam Fox, Maria Whittaker (in her Christmas Box of all things) and a host of anonymous females have featured in steamy stud poker extravaganzas. Perhaps the neatest twist yet to be added to a strip poker game appears in Infogrames quasi-paedophilic *Teenage Queen* (but you have to play to the end to discover that there's more than you'd imagined inside this filette.)

Top marks for unsubtlety has to go to the presumably myopic German programmers behind *Hollywood Poker Pro* – if battling to get the underwear off a fraulein isn't titillating enough, a magnify facility allows the player to roam over her flesh examining areas in minute detail.

Sex plays a major part in life, and always has done. Mankind, and in particular, man, has always been interested if not preoccupied by the act which gets him on the planet. Early man, once he had invented a few basic tools which led to increased leisure time, soon found his idle hand turning to cerebral matters like art. Using crude implements – twigs and scraps of animal fur – our cave-dwelling ancestors applied rudimentary pigments to the rocky walls of 'Dunhuntin'.

And the subject of these early artists? Why, man himself of course. Man going hunting, man working with his chums on the hunt, and very well-endowed man working on sex. When art was born it was delivered into the world with erotica, and an enduring tradition was created: as man invented new technologies he discovered that there was almost always a sex angle.

Moving on thousands of years, mankind got the language problem sorted out and invented ways of committing words to handy surfaces like parchment, tablets of stone and walls. Soon, those with creative minds began to think about about writing things down that would amuse and entertain anyone smart enough to be able to read. Poetry and prose arrived – along with written erotica and graffiti.

When the Hellenic civilisation was being set up and everything was being given a Greek name, the word pornography was coined to cover an increasingly popular literary form. (Those with a Classical education along with owners of etymological dictionaries will already know that pornography is derived from two Greek roots, *porne* – prostitute and *grapho* – write. Fortunately for the sake of variety, Greek authors with smutty inclinations soon found other things to scribble down, thereby widening the scope of the original term for posterity.)

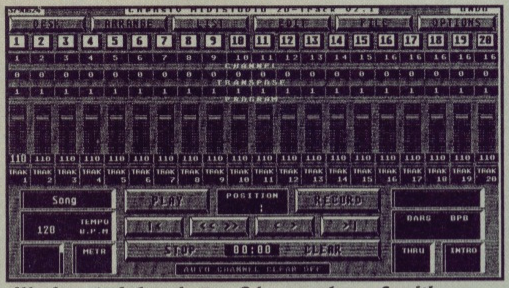
As the centuries rolled on, the human race developed new technologies, new ways of recording and distributing information, concepts and images – printing, sound recording, telegraphy, still photography, movies, television, video, holography... the catalogue continues to grow. And as each new medium evolved it was colonised by commercial interests, artistic interests and by those interested in erotica – or pornography.

Computing technology, of course, offers a medium for the creation, storage and dissemina-

LADBROKE COMPUTING INTERNATIONAL

Midistudio £99.99

Midistudio is a 20 track Midi Music Studio. This Midi software package is a realistically priced introduction to Midi music processing and includes the following features.
20 tracks each assignable one of 16 midi channels, each track can be transposed up or down 2 octaves, the main screen features full tape deck controls with individual volume sliders for each track, note editing facilities including editing of pitch, octave, duration and velocity, plus full midi controller editing(pitch bend, mod wheel. etc.). Full control over phrases is offered through Quantizing, transposing, and phrase arrangement software pages. The arrangement facilities allow moving and copying phrases on any of the 20 tracks. The package is easy to use and is a strong competitor with Pro 24.



" will give Steinberg's Pro 24 a good run for it's money "
ST WORLD March 89

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EDUCATIONAL SOFTWARE

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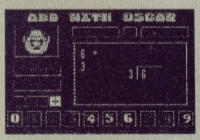

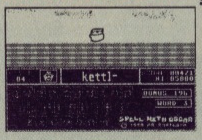

Spell With Oscar £12.99

Spell with Oscar is a game which teach spelling, keyboard skills and motor coor nation. Pictures of objects move smooth accross the screen and the pupil should sp the name of the object while Oscar chec for mistakes. Spell also incorporates sele able dificulty levels and a Hi-score tabl **Extra data disks £6.99**

TRILOGY £12.99

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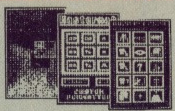
Mastermat is a formatter that optimises disk space, allows non standard sector and track formats/ fast read format.



Picstrip is a utility that captures all or part of a picture file for use in Basic programs, supports GFA, FAST, HISOFT and ST Basics and is Degas, Neochrome and AB Animator compatible.

AB Animator £14.95

AB Animator is a utility for creating and animating sprites. It supports GFA, HISOFT and FAST basics and is compatible with degas and neochrome picture files.Use the full icon control to animate up to 20 big frames of 56 pixels wide by 33 pixels high.

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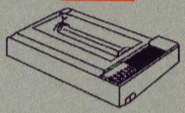

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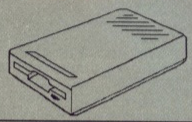

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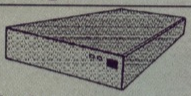

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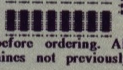

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tion of information. As soon as software could be published it was, and the supposedly cerebral nature of computing didn't stop a reasonable chunk of this software being about sex. The concept of Pixel Porn was probably born in the ionised vapours produced by ENIAC's sparking relays, but there's little scope for smut in abstract concepts like numbers, no way that punched cards or paper tape streamers could be harnessed for the purposes of writing about prostitutes.

To begin with, the exciting potential of the computer as an interactive medium was lost on the sex-obsessed eggheads and computer operators, who were prepared to go to great lengths to get what they wanted out of their equipment. Using impressionistic shading techniques, generated by complicated backspacing and overprinting commands programmed into lineprinters, 'naughty' calendars were produced in computer rooms throughout the world.

The elite band of computerniks who had access to terminals in the early days began to find ways of entertaining themselves. Games such as *Star Trek*, *Hunt the Mugwump* and *Colossal Cave Adventure* came into being, but the minimal graphics capabilities of early multi-user mainframe systems meant that entertainment software was usually text-based. Of course, once the text adventure caught on there was no reason to keep things clean...

Around 10 years ago, home computing became possible and as inexpensive machines found their way into homes, people started writing and selling games for them. Soon boring versions of poker were dressed up, or rather undressed, with suitably motivating graphics. Text-based adventures made the transition from mainframes and then went their own sweet, sexy way with titles such as *Leather Goddesses of Phobos* – and even cartridge-based consoles got a bit of the sex action.

Sexual adventures, with or without graphics, have proved popular and the mainstream, respectable companies have been in on the act for some while.. Infocom's text-only offering, *Leather Goddesses*, is one of the best selling games ever produced by the company, Sierra On-Line have found the *Leisure Suit Larry* series – essentially the exploits of a gigolo – more than a little lucrative. More than a few operations closer to the seedy side of commerce have attempted to cash in on the sex adventure. Unfortunate Spectrum owners may have spent good money on games such as *Soho Sex Quest* commercially released by a company by the name of Malan, and even today similar offerings are still available. But not everyone wants to make money out of screen sex.

In much the same way that there's a whole world of 'amateur' material circulating in the form of hand-drawn, scribbled or cheaply duplicated dirt, there's a complete underground of samidzat smut in the computer world. Whatever your machine, whatever the format, there's bound to be some freebie erotica in the public domain for you – everything from digitised versions of pouting Page Three lovelies to animated sequences lifted from hardcore videos. Some of the work is of a professional standard* and achieves levels of polish that would suit a mainstream commercial release, some is funny if obscene – like an early Spectrum joystick yokel-waggler by the title of *OINK* – but most of it is just plain crude.

With the advent of 16-bit machines with advanced graphics capabilities and the processing power to achieve stunning animations, screen sex has taken a turn for the realistic. Owners of STs and Amigas have some truly remarkable software available to entertain them. Programmers are doing much more imaginative things than writing about prostitutes.

The opportunities for interactive sex on screen will really take off when technologies like Digital Video Interactive and Compact Disc Interactive take off. There's a wealth of programming talent just waiting for the chance to blend code with existing nudie video footage. ■

▼ **What the Butler Saw (ST)**

TELEPHONE TITILLATION

The suspendered jungle of small advertisements that is the mainstay of such publications as the *Sunday Sport* is not yet mirrored in the computer press. But there's still porno behind the

telephone button if you've got a modem and aren't afraid to use it.

Computer bulletin boards offer a major contribution to the computer pornography scene, so much of one in fact, that there are plans afoot to alter the law to make them illegal. Smut sections on the BBs we checked out offer stories ranging from vaguely frivolous encounters to explicit adventure games as well as one-to-one personal contacts. If you fancy being chatted up by a transvestite from Truro or a horny young lady from Helston, they're sitting behind their modems waiting for you to log on. And of course there are the pictures...

Hardcore porn pictures are being made available on several bulletin boards. Given the fact that animated sequences of digitised pictures are not hard to cobble together, it's easy to find mini hardcore movies to download for free. Filth fans could soon find a modem better value membership than their local video shop, despite high telephone charges...

On-line sex games in the adventure vein are becoming popular. These days, if you fancy wandering around a fantasy world, chasing sexually rampant goddesses (or even gods), getting down to a short bout of fondling, followed by some heavy petting – then get on the phone.

Bulletin boards cater to the masses but some serve minority groups. Gay boards offer on-line meeting areas, gay sex stories and pictures. The Pink Triangle and Lambda BB fall into these categories, both providing an exclusively gay board, although others nurture gay sections such as The Connection and Miniet-4. And Micronet's gay section, set up in 1986, is one of the most popular areas of the system.

A little deviant dialling should call up even more specialist boards that support sexual fetishes ranging from bondage and sado-masochism to TV (and we're not talking SKY channels here). Shortly after being propositioned by a transvestite, we felt it best to log off and end our investigations.

HARDCORE HOBBYISTS

So far there's no real trade in pixel porn – some dealers in printed material have experimented with smutty software but there's little demand for it amongst customers who patronise shops and mail order services that cater for traditional material. Even though the commercial opportunities are minimal, there's no shortage of home enthusiasts churning out material that spans all genres – from topless shots to stuff that would see you locked up if apprehended bringing it into the country.

DIRTY DISKS AND THE LAW

The man who could be described as the founding father of pornography – the author of the work colloquially known as Fanny Hill – was hauled up in front of the authorities and asked to justify his actions in writing what was the first book to describe sex acts in great detail. Poverty, it transpired, had been his motivation – so after an admonishment, the beaks let him off and granted him a pension from public funds to ensure he never wrote a sequel!

Nowadays, the powers that be are less likely to be so lenient. Obscenity laws lay down serious penalties for authors, artists publishers and dealers in material deemed to be offensive, and the Video Recordings Act of 1984 clearly covers sequences of moving pictures generated from a magnetic medium. Such as a floppy disc. Maybe bulletin boards will soon be raided by the Obscene Publications Squad or Public Domain libraries be obliged to certificate all their offerings just like a video hire shop. Who knows? The volume of sex-related material on computer means it will soon be attracting the attention of campaigners and the authorities.

One thing's clear though – just because it's on computer doesn't mean the long arm of the law can't reach it, or indeed you if you're involved in disseminating material that is judged to be obscene.

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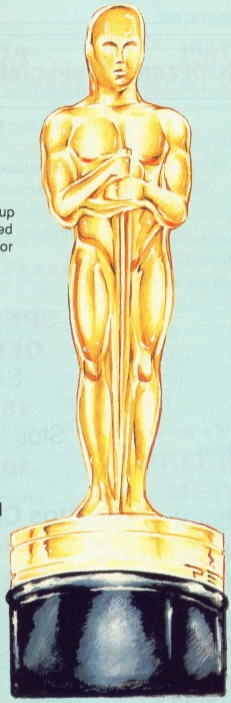

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SCREEN PLAY

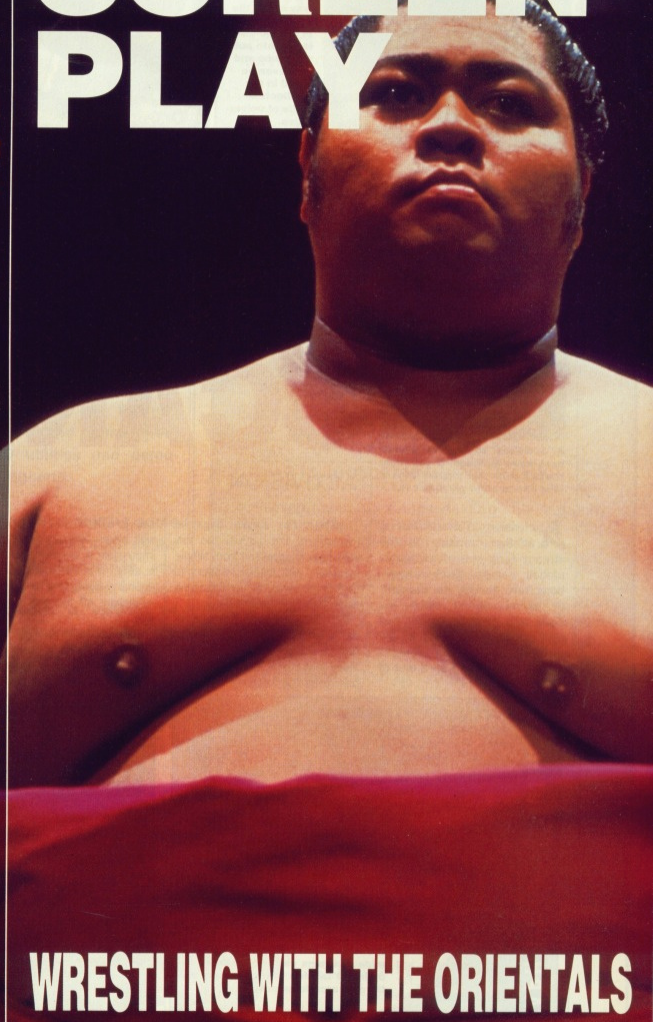
..NEWS....NEWS....NEWS..

At a recent European promotions event in Amsterdam, **Mirrorsoft** took the assembled press hacks off to an expensive hotel to treat them to the whole range of products coming soon on the Mirrorsoft label. Many products already previewed on these games

pages appeared, including **Interphase** – definitely one to watch out for. Mirrorsoft are currently setting the infamous Bitmap Brothers on a task to produce **Xenon II**, an early version of which was also on display there as well as making an appearance at the recent European Press Conference. **DDT** is another release lined up for the pre-Christmas period. It's a specifically Amiga game featuring 4096 colours. But definitely one of the most promising games on show there was **It Came from the Desert**, a game in the same vein as the spoof horror movies featuring giant ants which invade the world. Massive animated sprites looks set to promote this one into mega-stardom. The whole Mirrorsoft crew were there to discuss their products – in between visits to the **red-light** district, where far more than computer games were on show – but

the **Bitmaps** really stole the day and spent most of the time attending interviews and having their photographs taken just to prove that it really was a working trip.

Meanwhile, **Microprose** have been busy taking over the UK software industry. Over the past month they have acquired a deal to distribute all Incentive software in between intensive negotiations to purchase **Telecomsoft**. Maybe we'll finally get to see **Weird Dreams**.

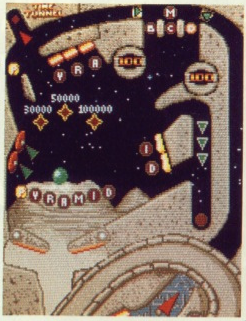


WRESTLING WITH THE ORIENTALS

Lords of the Rising Sun and Battlehawks step into the ring

PLUS ...DARK SIDE 88 / THUNDERBIRDS 84 / JOYSTICK JURY 94...

■ Since the introduction of the tilt feature in the 1950s the pinball machine has made it's way out of the seedy corners of arcade galleries into pubs and clubs and may even be found in the intellectual walls of universities. These shots show the original arcade game on the left and Activision's contribution on the right.



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ST – Imminent . £19.95

STILLS 0 1 2 3 4 5
ANIMATION 0 1 2 3 4 5
SOUNDTRACK 0 1 2 3 4 5
LASTING INTEREST 0 1 2 3 4 5
OVERALL 67%

■ Additions to normal pinball have been included. If you miss the ball with your flippers then it falls into another playing level.

TIME SCANNER

ACTIVISION

Activision's *Timescanner* is another addition to the already long line of computer pinball games. Such simulations have flooded the computer scene almost since the computer first developed SHIFT keys, way back in the distant age when babies weren't brought up on a diet of glass.

Since the simple bagatelle machine of the 1890s, the pinballs have progressed from simple machines with electric flippers to multi-level monstrosities boasting all sorts of unusual additions.

The home micro version of the pinball machine has always had a bumpy ride. One of the finest features of any pinball game has to be the ability to leap from side to side as you tap the flipper with bionic reflexes. Naturally, it's impossible to achieve this dramatic effect with the keyboard of any ordinary home micro – without wrenching off the disk drive anyway.

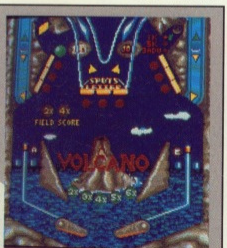
Timescanner makes no new innovations in this area but it does offer one of the more realistic simulations of ball movement. Shift keys are used to control the left and right flippers with the main objective being, as always, to amass giant high-scores. Even a tilt feature is available.

Four tables are split into two so that if you miss one of the five balls then you face a second chance. You can get through to other levels by taking a trip through the 'Time Tunnel'.

GRAPHICS AND SOUND

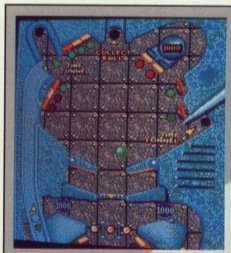
The backdrops in *Timescanner* have been very carefully designed to be as interesting as possible and provide the same kind of distractions as those offered in the actual arcade machine. The similarities between the two are astonishing.

Where the game fails is in it's lack of illuminated displays each time the ball hits a plunger. Far more could have been done graphically in these areas. However, this has been well compensated with some impressive sound effects which materialise regularly enough to keep your fingers twitching over the keyboard and certainly bring to mind the real arcade environment.



■ The different levels include pyramids and ruins set as backdrops in a similar fashion to those found on the real arcade games.

CONCLUSION



■ Looks simple enough but beware of level 4 though – it's in the *Breakout* vein and is damn near impossible to complete.

Fours Field, the team behind *ISS*, have written *Timescanner* with the objective being to create the perfect pinball simulation.

The limitations of the game are those faced by any computer pinball sim. The keyboard just doesn't offer the right scene for serious addiction but that aside, it offers a realistic challenge even though ball movement is dubious at times.

It's not an original idea but is still the kind of game likely to appeal to anyone with more than a passing interest in pinball games. Whether it will satisfy the real pinball addict who drools at the mouth every time he sees an idle machine is doubtful.

Mark Higham

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LORDS
RISING

CINEMAWARE/MIRRORSOFT

There was a time in history when matters of great import concerned the world and mankind lusted to become a part of it; when wars were fought and not winning but honour was what mattered most. Japan, that orange land bathed by the light of the rising sun, was one such place.

Cinemaware, long renowned for the astounding Defender of the Crown have produced this new interactive movie, set in that 12th century land of honour and dignity.

AIM

The game sees two would-be emperors fighting for domination of one crumbling empire. Yoritomo, the consummate politician and strategist faces the battle-skilled Yoshitsune in a legendary struggle to win control of the Japanese dynasty. You can select to play either of these characters, assuming the obvious advantages associated with each. The objective is to capture all 19 castles spanning the map of Japan and still manage to stand up straight afterwards. Along the way you can build up your skill ratings depending on the outcome of battle and your leadership abilities. Just to make sure the game isn't all blood and war, you can win the hand – and body – of a beautiful princess if you're lucky.

■ Once an order has been issued to your men, there's no way of retracting it.

STRATEGY

The game is arranged as a giant map with monasteries, castles, cities and an imperial palace strategically positioned to keep the action going acros the whole area. You initiall take control of three soldier who always begin the game i the same location. These ar directed around the map b selecting them whenever th come to a standstill and direc ing them to their new location They then follow the shorte path either on foot or by boat if they're beginning their jou ney at a port.

Different locations offer di ferent features: monasterie are neutral territory and ca often be relied upon to supp

■ Preparing for battle. You can decide to arrange your troops in specific patterns and then...

■ It's off to war. There are differ ent categories of troops wh can be controlled separately.

GRAPHICS AND SOUND

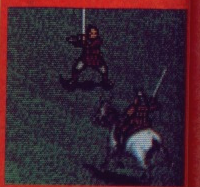
Considering that this type of game is based largely around its strategy elements, the graphics have been remembered at every turn. There is a remarkable resemblance here with Cinemaware's previous hit, *Defender of the Crown*, but there's far more interaction with the player. All sorts of animated routines appear at opportune moments from attacks by a Ninja assassin to tense battlefield occasions when you must participate in the bloody wars.

The superb animation is supplemented in most circumstances by atmospheric musical effects to convey the impression of ancient Japan. Probably one of the best examples of this occurs during the opening credits of the game, although the music at other points is almost as good, if a little repetitive.

Grunts and groans as your strike your enemies also appear at times as well as other spot effects to assist gameplay.

■ Back at home. You can despatch your own assassins – but beware, assassination is a dishonourable act. If you're caught then you've only one option – seppuku and that's a really painful way to go.

■ Horseback pursuit is a tricky task – you must avoid all the rocks and trees and still find time to wave your sword.



■ Give him a few blows of your trusty steel and he goes down easily enough.

SOF THE GSUN

FORMAT GOLD

food. Castles can either be attacked or an alliance suggested and the imperial palace is the place to go for imperial regalia such as the Sacred Sword or Scroll.

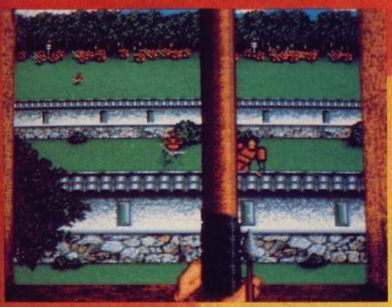
As you make your journey, you encounter other troops at which point you can intervene and suggest forging an alliance with the leader or attacking them. Either is usually a good suggestion since your own castles are often liable to attack if you're not careful.

As you make your journey there's often the need to stop for food to supply your troops. Visiting one of your own castles or a friendly monastery is advised for this task although the imperial palace is neutral territory and will often give food.

The game is punctuated with moments of interaction where you must participate in all sorts of encounters or attacks. In these moments the map is frozen and you move into the interactive phase where skill is rewarded with extra troops or new territory.

■ Most of the action takes place on the map where you can move your troops around 12th century Japan with ease. Only a small section of the map can be shown on screen at any one time but it can be further explored by clicking on the crane in order to scroll left or right.

■ The expert Ninja assassin. Your enemies can hire this fellow and you must use your sword to deflect his unwavering shiriken.



■ If you're unlucky enough to find your castle under siege then you must puncture the enemy with arrows to survive the day.

CONCLUSION

In its day, *Defender of the Crown* was reckoned to be one of the finest strategy games ever, but *Lords of the Rising Sun* looks set to usurp that enviable position. In many ways, *Lords* could be viewed as the next logical step considering the progressions made with the ST and Amiga on the games scene over the intervening years.

The challenge, as ever in this type of game, is not one likely to appeal to anyone unprepared to play for a long time. It's very much of a strategy game so the action moves sufficiently slowly to give you time to think. In moments of tension this can often prove to be too slow despite a speed-up option, although a save to disk feature is available. The game spans a wider battlefield than *Defender* ever did, and as such the gameplay is far deeper and potentially more appealing for the avid strategist.

With the long shelf-life of this kind of game it's certain to become the same classic which *Defender* proudly claimed.

Mark Higham

STILLS 0 1 2 3 4 5

ANIMATION 0 1 2 3 4 5

SOUNDTRACK 0 1 2 3 4 5

LASTING INTEREST 0 1 2 3 4 5

OVERALL 84%

Amiga – Mouse. £24.95. Reviewed.

ST – Three months away. £24.95.

BATTLE HAWKS

LUCASFILM/US GOLD

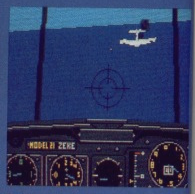
The land of the rising sun meets the home of McDonald's in Lucasfilm's latest game, a shoot-em-up/simulator set in World War II.

All of the action takes place in the Pacific during 1942 between Japanese and American navies. You can either play the role of an American and take on a small group of orientals or try to get even with the Yanks for the fast food and re-runs of Moonlighting.

There are four options located on the main menu: training, active service, review planes and review service record. The last of the four options alows you to use the preset pilot or start one of your own; a maximum of five can be stored on disk at a time and the record is updated after each mission. If you review the planes then you can look through the two airforces and find out what your friends and foes are like.

Training is a good place to start: you can practise dogfighting, dive bombing and torpedo attacks. The difficulty of the training missions can be easily varied from non-aggressive opponents through to deadly foes. Your plane may be customised to contain infinite ammo, fuel and even total invulnerability. In addition, the combat skill of your opponents can be adjusted to cadet, ace or veteran level.

As soon as you've finished with the training exercise you can head for the skies in an active missions. There are 16 missions in all and you can use the same customisation methods in these too, but your flight record is only updated if you play the mission without customisation. After each mission your record is updated on disk, unless you die of course, which case it's an obituary.



■ **The Yanks are out to sink your carrier with a squadron of dive bombers. You take off in your Zero fighter to blast 'em away and a dogfight ensues. In no time its Japan 1: USA 0 and a Yankee heads for the ocean.**

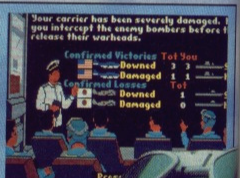
ST - Mouse/kbd. £24.99. Reviewed
Amiga - Mouse/kbd.£24.99.Out now

■ **Out in the Pacific lurks an American carrier and strapped to your underside is a large torpedo. Torpedoes really prefer being in the water so it might be an idea to get nice and close to the carrier at low altitude and let your torpedo go. Unfortunately the carrier will want to stay in one piece and so there'll be lots of Yankee planes after your blood and plenty of flak to dodge.**

GRAPHICS AND SOUND

Sound effects are limited to old-fashioned engine noises and bursts of machine-gun fire, with an occasional explosion tossed in for luck. The plane graphics are detailed enough for things to be recognisable, but little more.

In the cockpit there's plenty of detail included and the instrument panel is easy to read, which makes a change. Speed is a little disappointing, the action takes place at a slowish rate and 16-bit machines are capable of working much faster.


Your carrier has been severely damaged. If you intercept the enemy bombers before they release their warheads.
Confirmed Victories Tot You
Downed 3 3
Damaged 1 1
Confirmed Losses Tot
Downed 1
Damaged 0

■ **Another mission has come to an end and you can see how you fared.**

CONCLUSION

Many flight sims fall into the trap of being far too technical for the first time user, but *Battlehawks* can just be loaded and played. Fine control of the plane is possible for those that want it, but beginners only need a mouse to get started. There's also the added advantage that you can shoot down Americans and even be a traitor by gunning down your own airforce.

With 16 active missions and 13 training missions you have plenty of choice and the customisation can be used to make things easier or more difficult. There are plenty of planes to choose from too which adds to the variety. A flight sim which is probably better for beginners, but still fun for more experienced pilots.

Gary Barrett

STILLS 0 1 2 3 4 5

ANIMATION 0 1 2 3 4 5

SOUNDTRACK 0 1 2 3 4 5

LASTING INTEREST 0 1 2 3 4 5

OVERALL 73%

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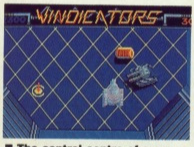
VINDICATORS

■ In orbit around the moon in a Grazer that has just returned from the asteroid belt. You're the human race's only hope. Can you handle the responsibility?

It may be hard for you to believe put poor old planet Earth is yet again in danger of being destroyed by an invading alien space fleet. In a situation like this there's only one thing that you can do – send out someone to eradicate the menace, and SR-88 battle tanks are ideal candidates for doing the destruction.

There are 14 alien space stations heading your way and the only way to destroy them is reach the control centre and blow it up. The control centre is deep with the space station and you have to blast your way through hordes of alien tanks, gun emplacements, mine fields and barriers before you can get there. Travel between levels is only possible when you have a key to the door and that's found somewhere on the level too.



■ The control centre of a space station; make sure that you get out before it explodes.

Fuel, smart shots and shields can be discovered lying around and improve your survival chances considerably. Small star-like objects can also be found and these are used in-between levels to customise your tank with any of the following: extra speed, longer range shots, smart shots, extra shields and more powerful shots.

One or two players can play and this adds to the fun, because not only do you have to decide who gets what objects, but you can also help each other out by shooting each other (it transfers fuel from one tank to the other).

There are plenty of levels to go through and the gradual increase in difficulty will keep you busy with *Vindicators* for many hours.

Gary Barrett

ST – Joystick. Reviewed. £19.99.

Amiga – Out soon. £19.99.

DOMARK

STILLS	3.0
ANIMATION	3.5
SOUNDTRACK	3.0
LASTING INTEREST	4.0
OVERALL	**71%**

Space is big, infinite even, and so the chances of a particular lump of ice ploughing into a certain planet are very slim. But in an infinite universe there are lots of big lumps of ice floating about and so the chances of being hit by one increases considerably. Earth is one of the lucky planets that just so happens to be in the path of a lump of ice which got bored of staying in the asteroid belt. After a futile attempt to deflect the 20 billion tonne asteroid, it plummeted into the Pacific Ocean and punched a hole through the sea bed. Molten rock poured out and vapourised a large portion of the Earth's seas. Life on earth ceased to exist.

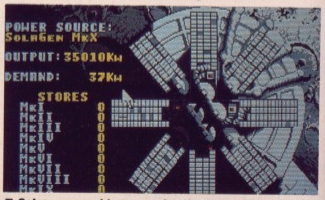
The year is 2200AD and fortunately for the human race Earth isn't the only place on which people lived, there's a small colony on the Moon. You command the small lunar colony, Lunar 1, and must find a way to keep the human race alive.

There are seven sections to the base, each one controlling a different function. The seven are: energy, life support, research, resources, production, defence and flight deck.

GRAPHICS AND SOUND

Most of the graphics are static screens with a small sprite or two, but every planet and satellite in the system has its own picture and some are excellently done. When your base is under attack and you launch a fighter the screen display changes to a 3D view out of the cockpit with simple, but effective filled-3D enemy ships.

Sound effects vary according to which of the many menus that you're accessing. All sound right and add considerably to the atmosphere of the game.



■ Solagens provide power for the base. There are 10 models of varying power. Some products require the most powerful generator before you can build them.

The sections are all interlinked for instance, before you can build a spaceship you first have to research it, then get hold of the resources to construct it before handing over the problem to production.

All you have to do now is keep up the construction work and keep the human race going. You also have a whole solar system to explore, colonise and extract materials from.

With a bit of thought and skill, after a while you'll be happily flying through space and going where no man has gone before.

■ Research is a very important part of the base because before you can build something with the production section you have to design it.

CONCLUSION

The solar system is a big place to explore and there are many planets for you to colonise.

You also have the occasional natural and unnatural disasters to deal with. All of this adds to the fun as you scour the solar system looking for a particular element and fight off the nasty little green men. Keeping the human race going is no simple task and you'll get plenty of enjoyment as you try and keep your race alive. The fate of the humanity is in your hands.

Gary Barrett

■ The flight, deck where up to eight craft can be docked with base. Initially you have no spacecraft, they have to be researched and built.

■ Once your craft has been designed you pass it over to production and they take the necessary materials from resources, providing you have the materials of course.

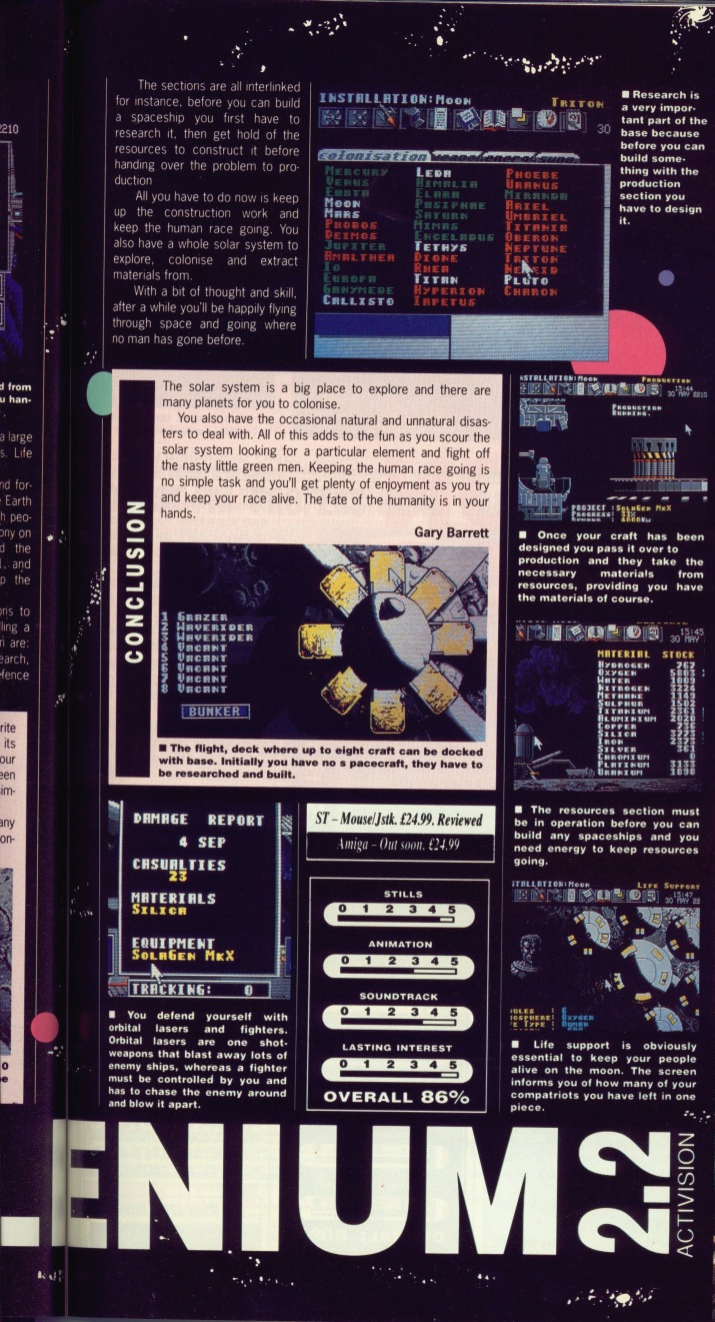
■ The resources section must be in operation before you can build any spaceships and you need energy to keep resources going.

■ You defend yourself with orbital lasers and fighters. Orbital lasers are one shot-weapons that blast away lots of enemy ships, whereas a fighter must be controlled by you and has to chase the enemy around and blow it apart.

ST – Mouse/Jstk. £24.99. Reviewed

Amiga – Out soon. £24.99

■ Life support is obviously essential to keep your people alive on the moon. The screen informs you of how many of your compatriots you have left in one piece.



■ Before you can collect an object from the sprite king you have to capture his people and before that you need to shoot down their flyers and dump them in the water.

■ Return the object to the Spirit Guardians for an extra weapon and a new mission.

■ Shoot one of the islands to get a flyer out and about.

TYPHOON THOMPSON

DOMARK

Travel has always been hazardous and space travel especially so. The passengers of Flight 396 would agree with that, but unfortunately they're all dead. Well almost all anyway, one small child survived the disaster and is now somewhere on the watery planet of Aguar. The child has been adopted by sea sprites and they won't give him back; you have to rescue the child.

Before the game itself begins a spaceship appears and a raft is dropped out, a door opens and you walk out and look down. Cowardice must run in the family because you run back inside again, only to be forcibly ejected from the ship by one of a variety of methods. Much better than just starting the game in the raft.

GRAPHICS AND SOUND

In play there are occasional tunes, but no continuous ones. Sound effects are simple, but fun, especially the angry sea sprite king. The graphics are fast, smooth, colourful and most of all cute. There are many subtle touches that make the game more enjoyable to play. The little sprite king looks very good when he jumps up and down and stomps his feet and your heroic character even shakes the water out of his hair when he appears from an underwater venture.

CONCLUSION

The first couple of levels are very easy to do, but once you get to the third you're problems really begin. There are so many sprites to deal with that you'll find yourself just screaming with frustration. Unfortunately (or fortunately you'll end up hooked and there's nothing you can do to stop yourself from playing.

You're gonna need all those lives to stand any chance on the later stages of the game, and you will eventually capture all those little b******s, but before you do you'll have invented a couple more expletives and thrown your mouse through the window.

All in all it's an excellent game that will keep you frustrated and amused for a very long time.

Gary Barrett

STILLS 0 1 2 3 4 5

ANIMATION 0 1 2 3 4 5

SOUNDTRACK 0 1 2 3 4 5

LASTING INTEREST 0 1 2 3 4 5

OVERALL 86%

Once you're in your raft you head for a nearby pair of islands where you meet the Spirit Guardians of Aguar. They bestow upon you a laser cannon and ask (or maybe that's demand) you to fetch a dagger from a set of islands.

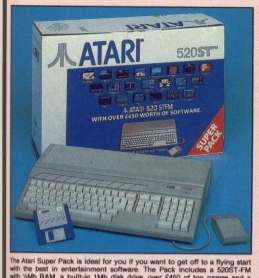
Off you go to the islands and when you arrive you have to shoot an island. Out of it pops a flyer which is piloted by a sea sprite. Shoot it and the sprite is deposited in the water and then all you have to do is go and collect the sprite in a little bag. Don't leave him too long or he'll turn into a fish and swim back to the island. Once you've collected all the sprites from the islands you then head for the central island and the sprite king will leap out. After a quick look round he jumps up and down in an angry frenzy and vanishes back inside his home. Give him back his sprites and he'll give you the dagger. Return to the Spirit Guardians and you go onto the next level.

This is then repeated with you looking for another object:: hammer, balloon or supressor (a dummy to me and you). In subsequent levels there are more sprites per flyer and more flyers too which makes the process or collecting sprites much more difficult. Later levels also have the added disadvantage that extra flyers are added to an island when those pesky fish manage to get back there. All that's left for you to do is scour the ocean blasting flyers and collecting sprites. Soon that little child will be in your caring hands and can live happily ever after.

ST - Mouse. £19.99. Reviewed

Amiga - no version planned

520ST-FM SUPER PACK



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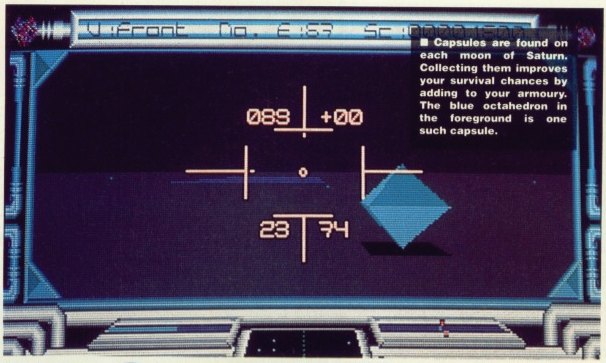
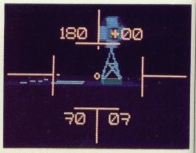


■ **Capsules are found on each moon of Saturn. Collecting them improves your survival chances by adding to your armoury. The blue octahedron in the foreground is one such capsule.**



■ **Enemy radar stations can be jammed temporarily by the use of a radar missile.**

VOYAGER

OCEAN

Once upon a time there was a little spaceprobe called Voyager II that went on a long journey. It left a blue-green planet called Earth and went for a look around the solar system. After a while it left the solar system and drifted out into deep space. In the year 2032 it was picked up by a scout of the Roxiz Empire and she returned to her homeland where Voyager II was regarded with great interest.

Rather than accepting the friendly greeting from the Earth people the Roxiz Empire decided that a bit of conquest was in order and set off to achieve the said objective. They set up base in the vicinity of Saturn where they used its moons to create more and more powerful weapons for Earth's conquest.

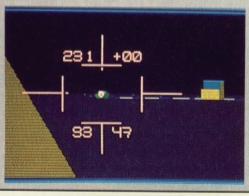
Meanwhile, Luke Snayles was on his way back to Earth after a 50 year criminal sentence of space exploration. No one wants to go home to freedom only to be subjugated by an alien race and so once Luke became aware of the situation he decided to save the world so that he could have a quiet rest. You'll never guess whose part you take.

There are 10 moons around Saturn that you must conquer and they get progressively more difficult. Top conquer a moon you must eradicate all of the enemies on the planet, 80 on the first one, Janus. Enemies come in several types: tanks, saucers, mine layers, mines and more. Tanks and saucers have the anti-social habit of shooting at you and mine layers just love to drop mines on the ground. Mines will turn you over and your mission will be brought to an abrupt end. Fortunately you can deal with these problems in the usual manner- blast 'em into little pieces.

Some pods and weapons can be found on the planet if you collect them then you'll improve your survival chances no end. they can be located with the aid of your navigational computer and a map of the planet. Finding these is just as important as dest-roying the Roxiz invaders.

GRAPHICS AND SOUND

Voyager is viewed in solid 3D with simple shapes to make things fast, but everything is still easily recognisable. Speed is much more important than detail in shoot-em-ups and that's what this basically is. Animation is fairly limited on most objects, but the radar stations rotate well and there are the occasional other effects. In play you only get simple sound effects, but there's a nice piece of digitised music and speech on the title screen.



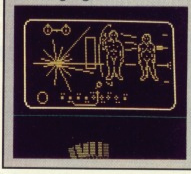
■ **A Roxiz tank passes in front of you. A quick zap and it'll be no more. Unfortunately there are lots more to get rid of.**

ST - Mouse/kbd. £19.99. Reviewed

Amiga - £19.99. Out soon

CONCLUSION

Voyager looks like *Starglider* and plays a little like Battlezone with you moving around a planet, blasting away at aliens and generally creating havoc. With 10 moons to conquer your work is going to be cut out for you, but you'll get plenty of opportunity for gratuitous violence.It's not the sort of game that you'll complete or get bored of in an hour, more likely it'll take you many weeks to complete and you're sure to get lots of enjoyment out of it in the meantime.



Gary Barrett

STILLS	0 1 2 3 4 5
ANIMATION	0 1 2 3 4 5
SOUNDTRACK	0 1 2 3 4 5
LASTING INTEREST	0 1 2 3 4 5
OVERALL 76%	

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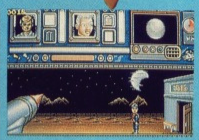
THUNDE

GRANDSLAM

■ **Level two sees you raising the Thunderbirds submarine by repairing the hole in its side. You must then disable the nuclear reactor.**



■ **Level three and the objective is to rob the Bank of England and discover secret notes on why the sub was mined in the first place.**

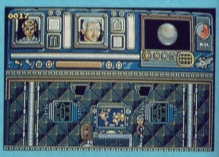
Grandslam's latest licence is going to recall memories for every self-respecting TV addict. The classic Anderson puppet hit sees its debut on the computer screen in the form of an anti-violence strategy game.

It's split into four levels with a different mission assigned to each. The only way of surviving these is to overcome the difficulties using the correct object. Each level is played with two characters and at the start of a level you need to select two objects to carry from a list of six. You can only carry two objects at any one time so anything you encounter during gameplay must be swapped for something else you're carrying.

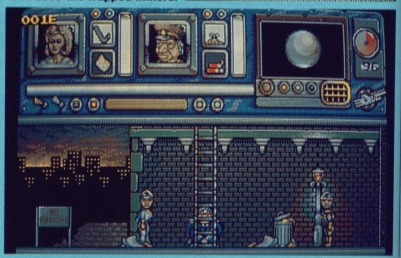
Being a strategy game it takes hours of play to find out what to use and when, but practice is the best teacher. In level one for example, you'll need to carry the torch with you in order to make your way through any darkened caverns.

Locating objects is essential to survive other difficulties, very much in the same vein as Grandslam's former hit,

■ **Capture Hood in level four. You'll need to disable his dastardly nuclear weapons scheme.**



■ **Level one and the mission is to save the trapped miners.**



GRAPHICS AND SOUND

The animation in *Thunderbirds* has been so carefully polished that every detail has been remembered. When you load up the game one of the first things to strike you will be the way that characters walk behind objects as well as in front of them. This feature even extends to the steel girders which allow to observe your character through the holes as he walks past. The effect of this is to give a very real impression of the landscape.

Digitised pictures make up the start of each level accompanied with sampled sounds taken from the TV series so that the old 'five, four, three, two, one, Thunderbirds are go', greets you. Increased sound effects are promised for owners of double-sided drives.

■ **With each level you're presented with two characters and you must select two objects to carry with you. These may then be exchanged for others during the game but beware, there are many red herrings to be found.**

SQWEEK

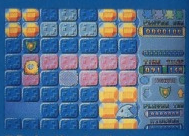
LORICIEL/US GOLD

Sqweek is the first game out of US Gold's new Loricel stable and offers a furry orange hero who has to wander through a myriad of levels converting blue tiles into pink ones. You control the mouse in his dubious exploits to rid the world of blue tiles but if that sounds easy then there's a host of problems tossed in for good measure. All sorts of icons appear for brief moments, granting you additional powers in your quest to change the tiles and dodge aliens in the time limit.

These icons give you such features as immunity from attack, the ability to freeze the aliens and even a range of multi-firepower to use as weaponry. A chance icon can be good or bad – one possibility is the unfortunate problem of converting pink squares back to blue.

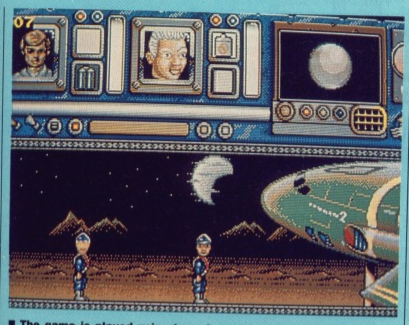
Graphically the game doesn't provide anything particularly stunning and sound effects are so repetitive and eight-bit that you'll turn them off as soon as possible but it's definitely addictive enough to see you coming back again and again.

The game is very much in the classic *Pacman* vein and is likely to appeal most to those gamesters seeking a rest from the usual intensive alien zapping or strategy elements. It's simple enough to understand and will



■ **Dodge the ghosties!**

ERBIRDS



■ **The game is played using two characters so that one character may assist the other. You can switch between them at any time but don't leave either in a dangerous position otherwise you could find his health suffers. Annoyingly, if one character runs out of health then your mission is aborted.**

■ ***Thunderbirds*** **is arranged in four levels. With each level you complete you are given a password which will then take you into the next level. This password may be entered with each new game and you'll be transported into the corresponding level. This takes away the need to work through each mission again.**

Terramex, however it stretches across a far wider terrain, thereby providing a more addictive and longer lasting challenge.

When Grandslam were granted the Thunderbirds licence, it was understood that they would not use any violence in the game. Faced with this problem they turned to comedy instead and many of the animation routines reflect this. For example, Alan pushes the trolley and gets carried away by it. Also, in the second level Gordon must employ his aqualung to get through the sunken vaults and his attempt at swimming seems remarkably similar to a drowning dog.

CONCLUSION

In it's day *Terramex* was acclaimed as a surprising addictive and unusual challenge but *Thunderbirds* is certain to appeal to an even greater audience. With an expanse of amusing routines, the Thunderbirds characters and an addictive gameplay with four different missions, it's certain to stand the test of time and become one of the great classics.

If there's any criticism to be levelled at *Thunderbirds* then it must be the complexity which will confront the first-time player. It's not the kind of game you'll pick up and win first time around but rather, it's appeal is likely to increase the more time you spend tackling the problems.

Thunderbirds seems certain to be a hit in which case Grandslam have promised a version II – we'll keep you posted. In the mean time, Thunderbirds addicts should watch out for next month's competition in which you can win Thunderbirds memorabilia, including models of the puppets.

Mark Higham

ST – Joystick. 3 disks. £24.95.

Amiga – Out soon. £24.95.

STILLS 0 1 2 3 4 5

ANIMATION 0 1 2 3 4 5

SOUNDTRACK 0 1 2 3 4 5

LASTING INTEREST 0 1 2 3 4 5

OVERALL 77%

probably rear its head at Christmas for relatives to play because they have neither the skill, intelligence or sheer desire to play anything as complex as *Lords of the Rising Sun* or *Blood Money*.

It's annoying then that *Sqweek* is as addictive as either and although you might laugh each time you drag it from its packaging you can be certain you'll go back to it often enough.

Mark Higham

ST – Joystick/Keybd. £19.95.

Amiga – Out early June. £19.95.

■ **The thugs make it a challenge.**

STILLS 2.0

ANIMATION 2.0

SOUNDTRACK 1.5

LASTING INTEREST 4.0

OVERALL 52%

■ **The furry fellow functions best when he's got multi-fire under his belt but the right icon doesn't make a regular appearance.**

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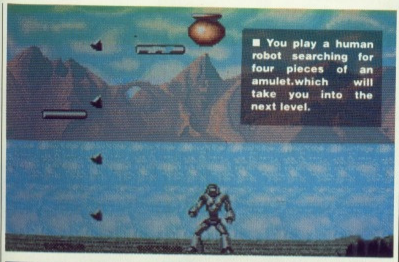
BIO CHALLENGE

PALACE



■ You play a human robot searching for four pieces of an amulet.which will take you into the next level.

It's official – there are problems with our genes and the human race is getting weaker. Scientists have perfected a technique to graft the human brain onto a robot's body – the same operation Norman Tebbit had – and you're to be the recipient.

Your purpose is to collect sections of an amulet and hence advance through the levels. The real difference from most multi-level games comes when swarms of bee-like aliens appear on the scene. You must spin round faster than a bionic hamster on an exercise wheel and then touch your enemies who evaporate. If you jump in the air at the same time you're able to knock floating platforms to one side, which is important as the ground monsters are your real enemy. These shuffle around and are killed by the falling platforms at which point they deposit either metal or sections of the amulet. Once you've accumulated all four sections you move through to the 'guardian phase' where any collected metal can be used as firepower to defeat the resident monster.

ST – Joystick. £19.99

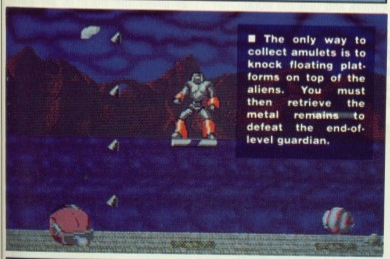
Amiga – Imminent

GRAPHICS AND SOUND

Movement across the landscape causes the screen to scroll sideways. Your humanoid robot is capable of running although the screen does little to reflect his speed. Featureless monsters scuttle around looking more like troublesome maggots than anything threatening. However, the end of level guardians are large and effective.

Sound on the ST version is limited to minimal spot effects but the Amiga version shows real promise in this area with superior effects including a trendy soundtrack. The gameplay and backdrops are little different on the Amiga version although more colours have been implemented

■ **Cauldrons can be any of six colours and give additional powers such as increased armour and lives.**



■ The only way to collect amulets is to knock floating platforms on top of the aliens. You must then retrieve the metal remains to defeat the end-of-level guardian.

■ **Each level has four sub-levels accessed by spinning up towards the revolving cubes.**

CONCLUSION

What makes *Bio Challenge* a far better than average game is the unusual playing features. It's not just a shoot-em-up because it's more complex than that. Action is impressive with a difficulty level certain to sustain your interest for a long time. Whenever you overcome one problem – such as locating the sections of the amulet – you're immediately faced with another – defeating the end-of-level guardian. Lack of firepower takes some getting used to but spinning soon compensates. *Bio Challenge* has already done well in France and looks set to be a real hit here with addictive gameplay certain to see your fingers pulsating with life.

Mark Higham

STILLS	0 1 2 3 4 5
ANIMATION	0 1 2 3 4 5
SOUNDTRACK	0 1 2 3 4 5
LASTING INTEREST	0 1 2 3 4 5

OVERALL 86%

DARKSIDE

INCENTIVE

FORMAT GOLD

■ The telepod can zip you around the planet, but you have to power it with telepod crystals first.

Almost 200 years have passed since the events that took place in Incentive's previous release, *Driller*. Now the Ketars live on the moon Tricuspid which orbits your home planet of Evath.

On Tricuspid there has been a built a huge weapon called Zephyr One (Did you know that Incentive are based at a place called Zephyr One?) with which the Ketars intend to destroy Evath.

AIM

A massive amount of energy is required to fire the weapon and this is collected by a network of interconnected solar panels called ECDs (energy collecting devices). All you have to do is destroy the network and save the world.

To help you in your mission you have a jet pack, a laser and a force shield. Unfortunately fuel and shields are in limited supply and you must find a way to replenish them during the game.

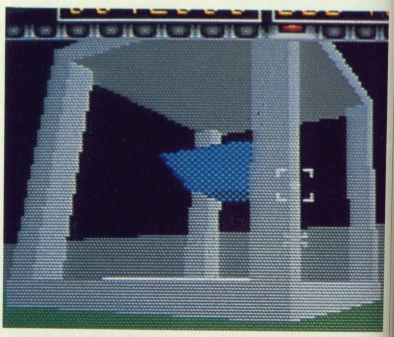
STRATEGY

In *Driller* the pace of the game was very sedate and you had lots of time to do things, but *Darkside* is much faster paced. Initially the ECD network is charging at 100% and if you're going to stand a chance at all at completing the

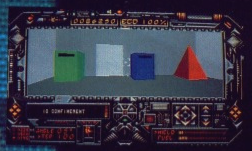
GRAPHICS AND SOUND

The static graphics in *Darkside* are very similar to those in *Driller*; buildings made up of blocks of colour with extensive use of shading to help enhance the three-dimensional effect. There's more animation in Darkside though and more of the Ketar forces move around rather than just sitting there gathering pixels (dust). Sound is a vast improvement over *Driller*'s which was distinctly eight bit. There are not only some very very good sound effects, but also an atmospheric tune that goes on for ages before repeating.

■ **A line of ECDs to be disabled, but you have to shoot them from right to left or they'll just regenerate again.**



■ **A power porter can zip you around the planet quickly.**



■ Doing some porridge after getting zapped by a scanner. Shoot the letter-boxes if you want to open the door.

■ Inside the stores you'll find columns to fill your jet pack and power sockets to charge your shields – both are essential.

PRGRAMMERS

The team behind *Driller* and *Darkside* are Major Developments. The main members of this infamous team are Ian (Dan Ayckroyd) Andrew, Chris (Freescape) Andrew, Sean Ellis, Wally (Hagar) Beben and Robin Chapman. All bracketed comments are found inside *Darkside* along with digitised pictures of some of the above. Ian doesn't want us to tell you how to find them though, you'll have to do that for yourselves.

Ian came with the plot for the game and his brother Chris is responsible for designing the Freescape system. Sean Ellis programmed the 16-bit versions of Darkside and also wrote *STAC*, the ST adventure creator.

Hagar (we're not sure if that's Hagar the Horrible) composed the music, as he has done on countless other games and Robin Chapman is responsible for the graphics.

Next month will see the arrival of *Total Eclipse* and after that? Well you'll just have to wait and see because the next game is not due for release until about this time next year.

game you need to disable as much of the network as possible in the first few minutes of play. Disabling an ECD isn't easy however, because you can only disable one if it's at a terminus. ECDs connected to more than one other ECD regenerate almost instantly.

The Ketars haven't left the place unguarded though, they want Evath to be in lots little pieces and so tanks, satellites and forcefields litter the planet. Forcefields deplete your energy if you hit them and shots from tanks and satellites do the same. Running out of fuel can be equally fatal when you're flying, because once gravity grabs hold of you it just won't let go until you hit the ground and go splat.

Apart from disabling the ECDs and avoiding or destroying the Ketar forces there are other problems that you'll face: collecting telepod crystals, finding hidden doors and activating switches to get to other sections of the moon.

In some sections of the planet there are sensors which deposit you in prison and the only way to get out again is by paying a fine. Inside the jail there are two letter-box-like objects, one takes fuel and the other shields when you shoot the slit. After enough shots have been fired the door will open and you can leave.

Make sure you choose wisely because the only way out of the jail is by going up through a trap-door.

■ Plexor tanks guard some locations and they have to be avoided or destroyed.

■ A network of corridors lie just below the surface. A safe way to move around the planet.

CONCLUSION

Graphically, Freescape games have always suffered from a very boring block structure and there's no change here. However, challenging strategy elements certainly keep your mind off of problems in the effects department.

Darkside has the one thing that was lacking in *Driller*, some pressure to drive you forwards and make sure that you don't waste time. The problems are more logical in their solution and the fact that your opponents move around makes for a more challenging and demanding game.

Gary Barrett

■ A sphynx sits in Triton sector, perhaps a subtle hint of the Egyptian flavour of Incentive's next game, *Total Eclipse*.

Amiga - Mouse £24.95 Reviewd

ST – Out soon. £24.95

STILLS
0 1 2 3 4 5

ANIMATION
0 1 2 3 4 5

SOUNDTRACK
0 1 2 3 4 5

LASTING INTEREST
0 1 2 3 4 5

OVERALL 87%

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In space no one can hear you scream. You send out your distress signal in the vain hope that someone will hear you. Someone always does, and his name is Captain Gamebusters

AFTERBURNER

ST

Here are some tips for *Affterburner* on the ST. Pause the game and type in 'THUNDERBLADE'

Now you should find that:typing the following keys will give you:

G=gives extra missiles
T=reduces your missile supply
<=jumps to the next stage
>= returns to the previous stage
N= gives extra lives

Chris Brown
Wisbech, Cambs

ULTIMA V.

ST & Amiga

To destroy the Shadowlords, you must first know their names. These can be learned by going to one of the three castles that represent the principle that each Shadowlord opposes. Once there, ask the owner of the castle (normally the king) about the Shadowlords. The person will usually tell you where to go and who to ask for more information.

Once you have the name of a Shadowlord, you must then get the shard of the Gem of Mondain from which that Shadowlord draws its power: it is located in the Underworld. Once you have the Shadowlord's name and shard you can return to the castle that the Shadowlord opposes. Go to the flame of love (for the Shadowlord of Hatred, for example) and yell the Shadowlord's name. The Shadowlord appears two spaces from you. Throw the shard into the flame (by 'using' it), and attack the Shadowlord. You should cast several Vas Flam spells at the Shadowlord, or repeatedly attack it. You might have to use some Heal spells on your characters, since the Shadowlord will select one character and focus all of its attacks on that individual. When you destroy a Shadowlord it is gone forever, and you can then go after the next one.

When all of the Shadowlords are destroyed, you can resume your search for the lost Lord British. Do this by first locating and obtaining the Crown, Sceptre and Amulet of Lord British. Next enter the dungeon called 'Shame'. Go to the bottom level of the dungeon and enter the Underworld. Search the area (using many Blink spells and climbing mountains) until you find a large area of lava. Walk through the lava until you find a large area of darkness. Yell the word 'Veramoror', and then you can enter the dungeon of Doom. The bottom level of the dungeon of Doom is where you will find Lord British!

Martin Collinson
Otley, West Yorkshire

DEFENDER OF THE CROWN

Amiga

If you're having trouble winning in Cinemaware's medieval game then

WAR IN MIDDLE EARTH

These few tips should help people getting started on *War in Middle Earth* when game starts move Frodo, Pippin etc in a northwesterly direction on very hasty setting. If they avoid the Nazgul go and visit towns to the west making sure you stop and listen to Radagast etc. By the time you have done this all Nazgul should have started retreating back towards Rivendell. This allows you to stop and collect all items from towns etc on the way back. When all Nazgul reach the area just below Rivendell they vanish but are still there, find the nearest party of Rangers you can control and move them to this area, a battle will start where upon all Nazgul will be driven from the field.

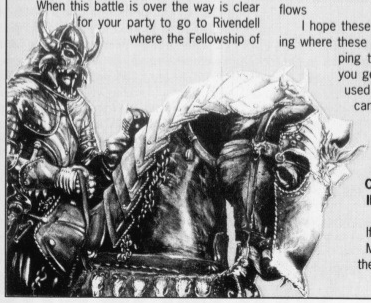
When this battle is over the way is clear for your party to go to Rivendell where the Fellowship of the Ring will be formed.

Where to find objects.

North of Mount Erebor	Hammer
South of Mount Gram	Red Arrow
Ancient Belegost	Mithril Mail
Buckland	Meet Merry
Road to Rivendell	Meet Aragorn
Bombadil's House	Elven Sword
Grey Havens	Potion
North of White Tower	Potion
West of Annuminas	Sceptre
Tuckborough	Black Flask
Old Forest	Wooden Staff
Michel Delving	Potion
South of Forland	Palantir
Mount Gundabad from where the Langwoll flows	Treasure

I hope these tips will be useful as knowing where these objects are saves you stopping to talk with people. Also if you get the Palantir first it can be used to find out where objects can be found and also gives you other information. Good luck on your journey to destroy the ring.

C A Shaw
Ilford, Essex



If you want to play War in Middle Earth as"The game or the book" rather than as a wargame then follow these simple instructions and Sauron will meet his maker.

The first thing to do is to get Frodo out of Hobbiton, because the Nazgul quickly converge on the area. It is essential that you go to Bree and meet Aragorn, because without him, Frodo doesn't stand a chance. As long as the Ring Bearer is in the party led by Aragorn, then he will be able to avoid almost everything encountered on the road, and to defeat those that can't be evaded, including Nazgul.

Once you have joined Aragorn, then head for Rivendell with all speed. You should not have too much trouble getting there, and joining up with the rest of the party. From there you can follow the book, and take the party down to Lorien, and to Osgiliath. Send Aragorn and Frodo past Minas Morgul, and up to Cirith Ungol. Here Aragorn will kill Shelob, and the way is clear down to Mordor. Once you reach Mount Doom leave Aragorn to fight the five thousand orcs, while Frodo beats a hasty retreat.

And that's it! Don't expect any spectacular scenes of Frodo throwing the ring down the Cracks of Doom, because there aren't any! No triumphant music, no banners waving, nothing except a view of the party of nine standing on the bridge in Hobbiton. Quite an anti-climax to an otherwise good game.

Bernie Stafford
Wirral, Merseyside

GIMME, GIMME!

Games players all over the world need help and the only people that can help them are other games players. If you're one of the lucky (or skillful) people that have blasted their way past every alien or solved every problem then send in your tips and who knows, you could even win yourself a couple of games as a bonus. Send in your tips and pokes to: *Gamebusters, ST/Amiga Format, 4 Queen Street, Bath BA1 1EJ.*

This month's winners are Daniel Vernon for his *Sword of Sodan* tips and Sarah Garner for her adventure tips. Both will be receiving prizes through the post shortly.

you might like to have 1024 knights in both your home army and your campaign army. All you have to do is hold down the 'K' key when asked to insert the second disk and you have an unstoppable army.

Craig Bourne
Stoke-on-Trent, Staffs

RAMBO III

ST

Type RENEGADE on the high score table, allowing you to press keys 1, 2, 3 on the title screen to access to the level of your choice.

Chris Brown
Wisbech, Cambs

LEATHER GODDESSES OF PHOBOS

ST & Amiga

Can't enter the orphanage? Put the baby in the basket and put the basket on the stoop. Hide and wait until the baby is taken in. Can't crack code? Replace each letter by its third previous one in the alphabet. For example A by X and R by O. Read the message backwards.

Sarah Garner
Redditch, Worcs

KNIGHT ORC

ST & Amiga

Spells and where to find them:

Charisma - Lake
Empathy - rotten apple
Cold - maze
Jump - smooth pebble
Eye - fire
Location - rainbird
Grow - marrow
Knives - vampire

Sarah Garner
Redditch, Worcs

BEYOND ZORK

ST & Amiga

Transportation scroll a problem? Say the word on the scroll at the stable house and whenever you are in trouble say the word and you will be transported back there. Shady wall a problem? Forget it. It's immovable. Can't save minx? Rub out footprints. Dust bunnies need dealing with? Rub bearskin rug and touch bunnies. Can't kill zombie? Throw vial of Holy water. Don't know how to deal with pterodactyl? Point Anthesia rod at it and take arrow. Rub wound with spenseweed and put saddle on his back. Then take the whistle.

Sarah Garner
Redditch, Worcs

SWORD OF SODAN

In general. Don't use any potions on levels 1 to 5, save them for later on, especially the last level.

On levels with barrels, back off when you see one approaching. This avoids touching the enemy when you jump over the barrel.

There is no time limit so never rush a level unless you have a power shield activated and you want to use it on the next level.

Level 1

As soon as the level begins jump forwards until you hear the guard telling you to halt, then begin attacking. Jump forwards to keep as near to the guards as possible so that they can't stab you.

Level 2

Attack the guard when you are between the single spikes and the double spikes. Avoid following him, instead back off a little then when he approaches you jump forwards then hit him.

Level 3

If the first two men are just a little too far away to be hit with the kneeling strike then change to the overhead blow. They will come a little closer allowing you to get them with the kneeling strike.

Attack the giant with the overhead blow. Never jump into him because his club will drain your energy considerably.

Level 4

To kill the fat guys, kneel and stab. They will continue to jump into the sword until they die.

Attack the two creatures in a similar way but keep backing off and quickly walking forwards again to get a few hits in.

Level 5

Kneel down to attack the zombies, this prevents you from being injured by their arms and the stuff they spit out at you.

Level 6

Use a power shield, this will stop you falling into the traps. Jump towards the man and continue to hit him. Follow him if he walks away from you.

Level 7

Walk forward until you are in line with the body on the wall. Kill the flying creatures with the overhead blow. Once they fall to the floor use a magic zapper to kill the man at the end.

Level 8

At first just be prepared to jump the fire that rushes along the floor. It begins to get tricky when the walls come down. It is best to listen for the fire and to keep looking at the top of the screen to get an early warning if a wall is about to crush you. When the steel spikes appear, the fire will stop. The spikes are more deadly than the walls, taking a whole life away when you are impaled on one, you should therefore concentrate more on avoiding the spikes than the walls.

When you reach the blocks section, walk to the edge of the pool of lava and wait until the first block is almost at the edge, then jump forwards onto it. Jump onto the next blocks when they are as close as possible to the one you are on. When you are on the third block wait until it is at the very edge of the floor before jumping because the end of the floor will crumble if you jump too early.

Avoid as many drops as possible and be ready to jump the fire. When you reach the stone skull, stand a little way from it and hit its teeth to make it slide back, revealing the exit.

Level 9

Kill the two pairs of creatures with the overhead blow (as in level 7).

Jump over the caterpillar-like creature when its head is as far down as possible. Walk past the potion to get the bird then walk backwards and the bird will eat the creature. Once the bird has finished eating walk forwards until the water starts to rise. When the water is just below the bird's mouth you should begin to jump. Continue jumping until the water is below its mouth. The wall will disappear allowing you to walk forwards again.

Hit the bits of fire with your sword to prevent them from injuring you. You can increase your hit strength by hitting the grey creatures on top of the wall. When they fly over your head use the overhead blow to get them and your hit strength will increase by one. When the wall disappears walk forwards to finish the level.

Daniel Vernon
Doncaster, South Yorkshire

The remaining levels will be ontinued next month.

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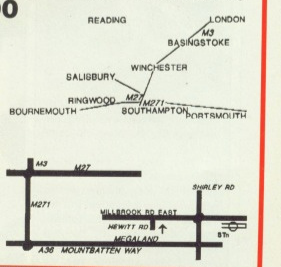

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JOY DIVISION

Choosing that just-so joystick can be a bewildering experience. JASON HOLBORN tries not to get confused

What is the single most popular add-on for a computer? A printer maybe? How about a colour monitor or even a modem? Perhaps surprisingly, it is in fact the humble joystick.

There are three different types of joystick; the traditional arcade style stick, the newer, more ergonomic type and the current flavour of the month, the 'trendy' hand held variety.

Joystick construction is a very important factor to consider. Most modern joysticks use microswitches to register movement but many older (and cheaper) models use rather unreliable leaf switches which tend to break rather quickly. How do you spot a microswitched joystick in a crowd? Easy, just move the joystick about and if it makes strange clicking noises then you know that it is microswitched.

So what should you be looking for when choosing you ideal joystick? And what type of joystick is best suited to the many different types of games available? Well, no one knows more about what joysticks are best for particular games than the programmers themselves. So, we've let them do the choosing.

MOVE OVER MOUSE...

Does anyone remember the controller used in the classic arcade games *Marble Madness* and *Missile Command*? It was of course the rather under-rated tracker ball.

If you fancy getting one for your ST you're in luck – an enterprising company has seen its way clear to make one. The unit is marketed by Hard Edge Communication, priced at £28.99, and is in fact a modified

version of the classic Atari Trackball, which was sold for use with the old Atari 800 computer.

This new ST version is purely a mouse replacement and cannot be used on any games which require a joystick. But for mouse-controlled games (particularly Firebird's *Virus*), the Trackball is a 'joy' to use. Hard Edge Communications can be contacted on 0742 665719.

PROGRAMMERS' CHOICE

Who better to judge a joystick than the people responsible their popularity – the games programmers themselves. *Format* popped the question to some of the big names in games design

Dave Jones of DMA Design – Dave, programmer of *Blood Money* and *Menace*, is a self confessed shoot-em-up junkie and for his purposes, the Dynamics Competition Pro 5000 (£14.95) does the job very nicely thank you. Surprisingly, Dave prefers the leaf switch version to the more reliable microswitched model.

Steve Bak says he's yet to find a stick to match the original Atari model. "If a company produced one like that for under £20 I'd buy 10," said Steve.

Tony Smith of DMA Design – Tony is infected with the same obsession for shoot-em-ups as his partner in crime, Dave Jones. "Dave can keep his Dynamics Pro, I wouldn't swap my Konix Speedking (£11.99) for anything!", says Tony.

Jez San of Argonaut – Jez, head programmer on *StarGlider 2*, has always been a great fan of the original Amiga joystick that was released in the States by Amiga, Inc. (before they were bought up by Commodore).

The unit is a very small device that fits snuggly in the palm of your hand and is controlled by your thumb. Recent faves include the Konix Speedking and Navigator.

Anthony Smith – Anthony's pick of the sticks is the old faithful Specravideo QuickShot (£10.95), a joystick that many a gamesplayer has been weaned on.

Giles Goddard of Argonaut – "Me? I like any large knobbly one!". Well, what more can you add to that!

SUPPLIERS:
Dynamics 061-626 7222
Euromax 0262 602541
Konix 0495 350101
Power Play (Mr Joystick) 04577 6601

FORMAT FAVOURITES

Richard Monteiro – Our editor has been through more joystick fads than you've had hot dinners. His pick of the bunch, until recently, was the Konix Navigator (£14.99) but he has since fallen in love with the Mr JoyStick's Crystal Clear Turbo (£16.99).

Jason Holborn – I give my Euromax Super Pro with autofire (£15.95) a good pounding most nights. Many joysticks lack the kind of pixel precision that games such as *Blood Money* and *R-Type* demand. Rapid fire is also a definite neccessity.

Stuart Anderton – Stuart's choice in joysticks is the Terminator, a now unavailable joystick that's shaped like a hand grenade. "I like the Terminator because it brings out the violent side of my nature.", adds Stuart.

Mark Higham – Mark's a chap who likes to have complete control at all times, so he like Richard chooses the Konix Navigator.

Gary Barret – Gary too, is a fan of the more traditional arcade style stick made famous by companies such as Kempston. Gary's longtime favourite is the Euromax Pro (£13.95) because of its reliability.

PREVIEWS

Soccer

Microprose ■ Amiga & ST ■ £24.95 ■ May

Let's hope that Microprose's programming abilities are much better than their footballing skills after the recent slaughter they suffered at the hands of a Future Publishing team. If not then you're gonna wipe the floor with the footballing game, maybe you'll even equal us with a 13:3 final score.

■ **Dickie 'Ed.' Monteiro comes running for the ball, but will the computerised Microprose team keep him at bay this time?**

Have no fear, no one can possibly program that badly.

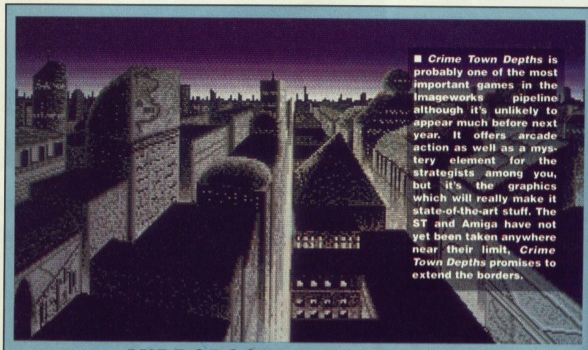
As soon as we get a review copy we'll let you know what it's like, it does look good.

Total Eclipse

Incentive ■ ST & Amiga £24.95■ Out soon

The third in the line of Freescape games should be with you next month. Deep space has been left behind with the setting now being the middle of the desert. Even more puzzle elements have been included in this one and time is again your greatest enemy. The occasional mummy proves to be a problem too.

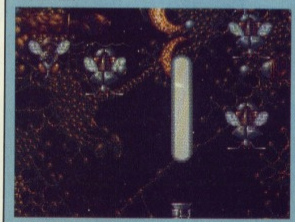
■ **Once again the fate of the world is in your hands. This time it's the curse of a long dead Egyptian pharaoh which is responsible. Save the world and get fame and fortune, or come to a sweaty end in the midst of the desert.**



■ ***Crime Town Depths*** **is probably one of the most important games in the Imageworks pipeline although it's unlikely to appear much before next year. It offers arcade action as well as a mystery element for the strategists among you, but it's the graphics which will really make it state-of-the-art stuff. The ST and Amiga have not yet been taken anywhere near their limit, *Crime Town Depths* promises to extend the borders.**

MIRRORSOFT INTO THE '90s

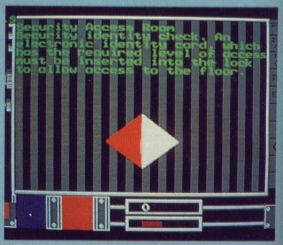
Mirrorsoft are hoping to confirm their position as one of the leaders in the home micro entertainment scene with their range of new products scheduled to appear in the months leading up towards 1990. On show at their recent European promotions event in Amsterdam were a host of games from the pool of programming companies falling under the Mirrorsoft umbrella. Just some of the Imageworks games to watch out for are shown here.



■ **The Bitmap Bothers had a phenomenal hit on their hands when they produced the ultimate shoot-em-up – *Xenon* and their follow up, *Xenon II* looks to be far more impressive. Land and sea scapes all make up the backdrops and these have been imported with samples taken from Bomb the Bass. It's likely to appear on the games scene around September.**

■ ***Palladin: Lord of the Dancing Blades*** **sees you coming up against wizards and witches in a bid to overcome the forces of evil. The objective is to find a tablet and deliver it to the sorcerer – presumably because he has a headache. But the strange plot aside, the graphics look stunning.**

■ ***Terrarium*** **is an arcade adventure game boasting action sequences set in a fantasy world. It's coming under the Imageworks label and offers impressive graphics from Splinter Vision. The release date for ST and Amiga versions looks likely to be around Christmas.**



■ ***Interphase*** **is one of those games to really watch out for. It might incorporate the best visuals ever but it does have some very impressive 3D routines. As long as the gameplay is good enough to support it then there's a possible Format Gold on offer here. *Interphase* should be available around September.**

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THAT OLD MAC MAGIC

You take one ST with no strings attached, plug in an innocuous looking cartridge, and abracadabra – one fully-fledged Macintosh. STUART ANDERTON tried pulling an Apple out of the hat

INGREDIENTS

To make one fake Mac you will need:

1 real Mac

1 ST with at least 1Mb

2 floppy disk drives or

1 floppy and one hard drive

1 serial cable with the right plugs

1 Spectre 128 cartridge

5 different formats of floppy disk

Some Mac software including a comms program

1 good book to read while setting up

Spectre 128
£199 ■ HiSoft
The Old School, Greenfield, Bedford MK45 5DE Tel: 0525 718181

MAC MACHISMO

So what's so great about the Mac? The ST has a WIMP (windows, icons, menus and pointers) environment too, GEM.

Anyone who has ever used a Mac and GEM will agree which is the better system. It's difficult to put your finger on why the Mac outclasses GEM – the Mac just feels like a smoother, more professional machine.

Little points add up – to move a file from one directory to another, for example, just involves dragging the file's icon between two windows, no copying then deleting. And you can double click on a data file, such as a wordprocessed document, and the relevant application will be launched and the file loaded automatically. Together with the lack of a hundred other niggles, the Mac is a much more relaxing system to work on.

Much more important, however, is the quality of Macintosh software. Especially in desktop publishing and technical drawing, there is a vast range of top-quality programs to choose from. No ST program even comes close to a Mac DTP package like *Ready Set Go!* or *PageMaker*.

Then there is the little matter of price; the Macintosh range starts with a single floppy (ie, virtually unusable) Mac Plus at £1,355. A more practical SE will set you back £2,000 or so. Running Mac software on an ST is rather attractive to the bank.

The *Spectre 128* makes a very simple claim; you plug it in to the ST's cartridge port and the ST miraculously becomes an Apple Macintosh.

It sounds incredible – particularly if you've experienced PC emulators like *PC Ditto* which, in all honesty, are slow, clumsy and don't work as well as claimed. The Mac is a much more sophisticated beast than the PC, so it's only right that you should be dubious of *Spectre*'s claims.

Enclosed in the box is a note from HiSoft, the distributors, explaining that they aren't at all happy with the set up procedure and the way it is documented. A quick glance through the instruction sheet confirmed this. Oh dear.

FIRST, FIND YOUR MAC

It's not worth describing the entire set up procedure – that would take two pages on its own. Suffice to say you need an Apple Mac, a serial cable, five different formats of disk, and a patient nature.

The basic problem is that the ST cannot read Mac disks directly. The format Apple chose is utterly different to Atari's – for example an ST disk spins at a constant speed, whereas the Mac disk's speed varies depending on where on the disk the drive's head is. A device to overcome this is in the pipeline – watch this space.

Because of the problem with disks, all the Mac software you wish to use has to be sent down a serial cable from a real Mac. Easy enough: you just run a communications program on your ST-cum-Mac and... ah, how do you get the comms software onto your ST in the first place? That's where the five different disc formats come in.

You send the Mac comms program, along with some vital system files, to the ST as data. Then translate them onto a disc which the Mac emulator can read – no, it can't read ordinary ST format disks. The translator program only recognises an old disk format used with a previous version of *Spectre* called *Magic Sac*. *Spectre* itself uses a different format again. Confused? You should be.

It'll take a couple hours to get a *Spectre*-format disk containing a comms program, a Mac system file, and Finder (the Mac's version of GEM). So at last, with the Spectre box firmly in the cartridge slot, you're ready to switch on and insert the boot disk. Running a program by the user-friendly name of 1SPEC19F.PRG gives you the configuration options – the default is usually fine. A dialogue box asks for the disk with the

Mac programs, click on OK and... nothing happens. Then, just as you are about to throw the machine against the wall, the screen fades to black and the smiley Mac image appears.

'Welcome to Macintosh' leaps onto the screen; the ST is transformed into a Mac. The appearance of the desktop is indistinguishable from a real Mac's – *Spectre* uses the actual Macintosh operating system ROMs. The only difference is the screen area – the ST's screen is 30 per cent bigger than the original's.

WELL IMPRESSED

With the initial set up out of the way, you can port Mac software down the serial cable with the comms program. After a few applications have been sent down the wire and tested your original doubts about *Spectre* will vanish.

This emulator works. It works well and it works fast. Ninety per cent of the time you wouldn't know you weren't using the real thing, and the difficulties of the differing hardware are coped with sensibly.

For example, the Mac makes extensive use of two unique keys on it's keyboard, Command and Option. These are mapped onto Control and Alternate respectively, which works well.

WHAT WORKS?

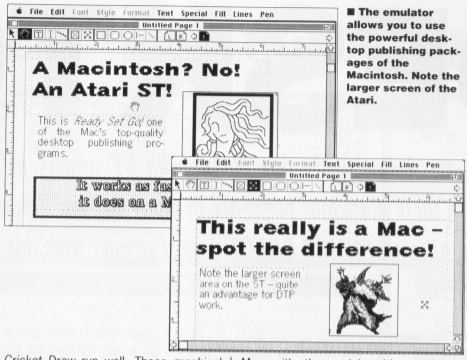
The vast majority of Mac software tested worked fine with the emulator. There is a long list of programs which are claimed to run, and the only difference of opinion with it is the spreadsheet *Excel*, which stubbornly refused to work – although admittedly a different version of the Finder was used.

All the major desktop publishing programs run without a hitch. *Quark Xpress*, *PageMaker* and *Ready Set Go!* work a treat except for printing out – more on that later. Similarly graphics packages like *Illustrator*, *Freehand* and *Cricket Draw* run well. These graphical applications are the Mac's strong point and the most likely reason for wanting to use *Spectre*.

THE EMULATION GAME

There are two main standards for 'professional' personal computers – the IBM PC and Apple's Macintosh. Because of the vast amount of quality 'productivity software' available for these machines several attempts have been made to make the ST run programs designed for them.

Emulating the IBM PC is desperately slow because the PC's microprocessor is entirely different to the ST's; the machine code instructions have to be translated from 8086 code into 68000. The Apple Macintosh uses the self same chip as the ST, so it should be really easy to emulate... right? Wrong! The Mac's unique operating system is stored on two ROM chips and all Mac programs use the routines built into these chips. The only way to get the ST to run Mac programs is to add the Mac ROMs to the Atari. That's what *Spectre 128* does.


File Edit Font Style Format Text Special Fill Lines Pen
Untitled Page 1
A Macintosh? No!
An Atari ST!
This is Ready Set Go! one of the Mac's top-quality desktop publishing programs.
It works as fas
it does on a M
File Edit Font Style Format Text Special Fill Lines Pen
Untitled Page 1
This really is a Mac – spot the difference!
Note the larger screen area on the ST – quite an advantage for DTP work.

The emulator allows you to use the powerful desktop publishing packages of the Macintosh. Note the larger screen of the Atari.

Speedwise the main problem is the floppy disks – a problem with real Macs too. *Spectre* will run on a single floppy machine, but it is utterly impractical. The problem lies in the way the Mac uses its files – it only loads in the bits of the program and operating system it needs at any one time, so it is continually accessing the disk drive.

Aside from the disk access problem, *Spectre* runs damned fast for an emulator. Some rough time trials show it to be marginally faster than a Macintosh Plus. *Spectre* runs at a perfectly usable speed.

VERY GOOD BUT...

OK, that's the good part, but what about the down side?

The first disadvantage is the hardware you need to usefully run *Spectre*. Forget using a 520. Forget a single disk drive. In fact forget floppies – a hard disk is virtually essential for serious Mac-ing. You can use your Atari's hard drive if you have one.

Considerably more serious is the problem of printing out your work. Macs are designed to only work with their own printers, the dot-matrix ImageWriter and the LaserWriter laser printer. If you have an ImageWriter lying around – unlikely as they are expensive and only work with Apples – you just plug in and go, otherwise you are stuck. To use a standard Epson-compatible printer you need a special printer driver which you have to buy separately for around £30. A driver for the Atari SLM804 laser printer is included.

Getting the high-quality printout of a LaserWriter is more of a problem. Printout to a laser printer uses a custom chip on the Mac that simply isn't there on the ST. The only sensible way to get laser quality output from the Spectre is to send your finished files back to the Mac with the serial cable – clearly impractical for more than very occasional use. Alternatively, if you have a modem you can send the files down the phone line to one of the many laser typesetting bureaux which offer on-line services. The real solution to this will only come when the planned add-on to read and write Mac disks is ready. Then you can just bully your friendly neighbourhood Mac owner into printing out the files for you.

THE BOTTOM LINE

Spectre 128 provides an excellent Macintosh environment running on an ST. It is highly compatible with the real thing and will happily run most of the software which makes the Macintosh such a desirable machine to own. It is fast, and when married up to a hard disk, considerably more pleasant to use than the ST's native GEM.

Its principal drawbacks are the difficulty of getting high quality printout and the time and effort it takes to set up.

Together with the promised device to read and write Mac discs, a Mega ST with a hard disk running *Spectre* offers a viable alternative to a real Mac at a fraction of the price. ■

IN – OUT

Mac disk drives eject disks entirely under software control, you can't do it by hand. To get round this the emulator flashes "A" at you when it wants you to remove a disk. As the Mac knows the disk is in the drive until it spits it out, it tends to write data to disk at odd times. So, although it takes some getting used to, you must never take a disk out of a drive unless the micro tells you to. Similarly you must eject all the disks before resetting, otherwise some data may be lost which had not yet been written to the floppy.

for

- Runs most Macintosh programs
- Fast and reliable
- Cheap at the price
- Well written, amusing manual

against

- Lousy setting up procedure
- Can't read Mac disks
- Needs extra software to print out
- Requires at least 1Mb and a hard disk

features 0 1 2 3 4 5

performance 0 1 2 3 4 5

ease of use 0 1 2 3 4 5

manuals 0 1 2 3 4 5

format value 0 1 2 3 4 5

DESKTOP

The knives are drawn again this month with ST owners battling it out against their machines. On these illustrious pages are so many tips you'll think you've fallen into a box of Liquorice Allsorts. PHILIP BEXON from Leicester wins this month's £30 prize for his musical STOS tip.

AND THEN THERE WAS SOUND

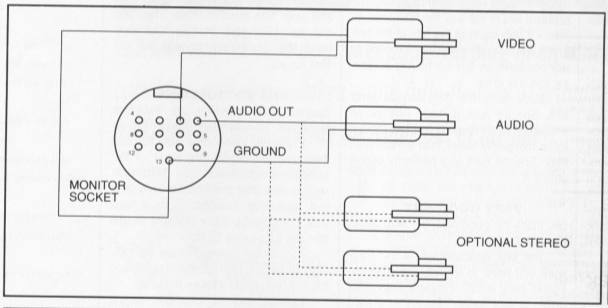
The composite video signal output produced by STs and provided via the monitor socket offers an excellent video signal which can be taken to a TV using the correct connections as indicated below. Additionally, the output from the monitor socket offers an audio line which may be taken to the auxiliary input on a hi-fi system.

Faisal Patel
Batley, West Yorkshire.

HARD DISKING

According to the *Timeworks DTP* manual the only way to print your pages onto disk is to give up living for a year and take the proceeds from this venture – hopefully around £500 – and purchase yourself a hard disk. Now *Timeworks* have this idea that this is the way everyone should live but in actual fact there's a far cheaper way to go about dumping the file onto disk providing you have a machine with a megabyte of memory or more. Simply create a RAM disk and give it the identifier C. Now when you print to disk it will be saved onto this RAM disk which can then be transferred onto floppy at a later date.

Andrew Triggs
Croydon, Surrey.



BEWARE THE DEATH RAY

All monitors are cathode ray generators which, by the very nature of their design, generate a large electromagnetic field around them. Three hours a day exposure to your monitor is reckoned to be about the maximum limit. Exceeding this can cause all manner of short term problems such as headaches, sleeplessness, and even heart disturbances. At present no one has been able to predict long-term exposure problems but it seems that cancer and genetic defects are a possibility.

A test in West Germany last

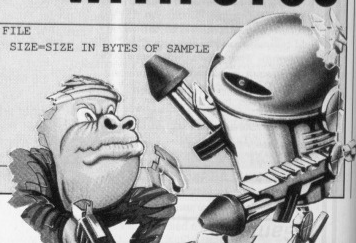
MAKING MUSIC WITH STOS

***STOS* is a brilliant package offering all sorts of great features for designing games but it has its problems. Sampled sounds can turn a mediocre game into a masterpiece but how do you go about including them into your well-designed Format Gold? One way of doing this is to use *Prosound Designer* to grab your samples and then find the SAMPLAY.EXE file. It is this file which plays samples in your own programs. To use it in *STOS* you'll need to copy this file onto a blank disk along with your sample. Next, load *STO S* in the usual way and enter the following program.**

Running this program should see your sample loaded into memory and then played at the selected speed. It must be remembered that samples take up phenomenal amounts of memory which obviously cuts down on the room left for your game. This idea will work adequately for samples taken using either Eidersoft's *Prosound* or *Replay 4* from Microdeal.

Philip Bexon
Shepshed, Leicester.

```
10 RESERVE AS DATA 6,1000:REM RESERVE BANK FOR "SAMPLAY.EXE" FILE
20 RESERVE AS DATA 7,(size):REM RESERVE BANK FOR SAMPLE FILE, SIZE=SIZE IN BYTES OF SAMPLE
30 BLOAD "SAMPLAY.EXE",6:REM LOAD "SAMPLAY.EXE" TO BANK 6
40 BLOAD "SAMPLENAME",7:REM LOAD SAMPLE INTO BANK 7
50 LOKE START (6)+28,START(7)
60 LOKE START (6)+32,START(7)+LENGTH(7)
70 LOKE START (6)+36,speed:REM SPEED = PLAYBACK SPEED IN KHz.
80 CALL 6
```



■ **The program to use your sound samples from within *STOS*.**

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year compared seventeen popular monitors. The inquiry concluded that the SM124 monitor from Atari was found to generate the smallest electromagnetic field and was hence the safest on the market. We ST owners are lucky devils!

Gerard Nolan
Reading, Berkshire.

FINDING THE RIGHT FUNCTION

Function key guides are a major asset to anyone who uses their ST for more than just playing games.

The idea is complicated to explain but it basically consists of taking several sheets of A4 size paper and binding them all together using a standard paper binder of the flat kind – ring binders aren't any good. When you have made sure that the paper doesn't fall out of the binder, the next step is to introduce it to a paper cutter. Trim your A4 sheets so that they are just under 1.5 cm wide and then throw away all the remaining pieces. This ridiculously shaped binder will now fit into the groove just above the ST keyboard and the slithers of paper can be made to fall close to the function keys.

Using Letraset you can then create a neat set of tables applicable to whichever package you're using at the time. You can then flick through these during use. So, for example, a separate function key guide can be designed for *GFA BASIC*, *Timeworks DTP* and *Fleet Street Editor*.

You can even use some pages to hold notes – such as the best pub to visit after a bout of GFAing.

Martin Leith
Newcastle upon Tyne,
Northumberland.

As of next month we will be opening up this page as a forum for debate about your ST problems. We'll try and answer any queries you have about your machine but at the same time we'd still like to hear all your tips and tricks. As ever, there's a reward of £30 for the tip of the month. Send your problems to *Desktop, ST Amiga Format, 4 Queen Street, Bath, BA1 4AJ*. And remember, ST problems only – no personal ones unless you want to give us all a good laugh in the *Format* office.

SHOWING WHAT YOU'VE GOT

Somewhere on your ST language disk is a shy little accessory program called the VT52 emulator. It's not a program which interests very many people. After all, what does it do and is it really any good? The VT52 emulator is designed as a kind of mini-comms program which takes input from the RS232 port and displays it on screen, whilst, at the same time, offering you the opportunity to send your own keyboard commands and data. The VT52 emulator is then a very simple terminal program.

As an emulator it responds to a set of codes which will change the on-screen display so that the cursor can be fired around the screen, text and background colours may be adjusted and the cursor can even be disabled altogether. These are obviously of specific benefit to anyone who deals with the VT52 emulator but where their wider impact can be found is in the use of these codes in standard SHOW files. When you double-click from the Desktop on a file without .PRG or .TOS extensions (ie. it cannot be loaded, nor can the file call up an application) then you will be presented with the option to SHOW or PRINT the file. SHOWing normally only produces standard and unimpressive text displays of the information but by making clever use of the same codes employed in the VT52 emulator you are able to create all sorts of interesting effects.

The codes are as follows and if used in a text file they should be in the form $1B, $xx where xx is the ASCII code of the character listed. $1B the code for ESC. Probably one of the simplest ways to do this is to write your text file leaving two spaces wherever you want the control code to go. Save your file and then load *Tinytool* or another file editing program and overwrite all the spaces with your control codes.

The commands listed below cause direct alterations to all screen output so that when SHOWing a file, the display can be made to look radically different. However, problems will occur if you try to PRINT the file or if you load it into a wordprocessor. The control codes included will prompt some very unusual reactions. Therefore, the codes are only any use as long as the file is SHOWn only. It is possible however to implement codes which will affect your printer so that if you PRINT the file then codes will alter printer output. In this circumstance, the screen output is likely to be affected.

INSERTING PRINTER CODES

Printer control codes may be included in a similar way to the SHOW file codes. A space must be left for each command code and then these can be over-typed later using a file editor.

So, for example, you could leave three spaces in your text and then replace these with the printer codes: ESC W 1 ($1B,$57,$1) which sets the printer into expanded text mode. These codes could then be used at least to provide a decent headline for your printed file.

VT52 ESCAPE CODES

ESC A	Cursor Up	This function moves the cursor up one line providing it is not already on the top line. Any text will then continue from this new location.
ESC B	Cursor Down	
ESC C	Cursor Right	
ESC D	Cursor Left	
ESC E	Clear Home	The entire screen is cleared and text continues from the top left-hand corner of the screen.
ESC H	Cursor Home	Returns the cursor to the top-left corner of the screen without clearing first.
ESC I	Cursor Up	This moves the cursor up one line. If it is already at the top then a blank line is inserted. The column position is maintained.
ESC J	Clear below cursor	The rest of the screen below the cursor is cleared.
ESC K	Clear remainder of line	The cursor position and the remainder of the line is cleared although the cursor does not move position.
ESC L	Insert line	A line is inserted and the remainder of the screen is scrolled down.
ESC M	Delete Line	The line with the cursor is cleared and deleted.
ESC Y	Position cursor	This allows you to position the cursor anywhere on screen. It's structured with the line and column values provided as parameters and 32 added to each. The result falls in this way: ESC Y CHR$(32+lines) CHR$(32+columns).
ESC b	Character colour	This is the command used to change the colour of all subsequent text output. Only the lowest four bits are recognised so values in the region 0-15 are acceptable.
ESC c	Background colour	This code changes the background colour in an identical fashion.
ESC d	Clear screen to cursor	This clears the screen from the top down to the position of the cursor.
ESC e/f	Enable/Disable the cursor	
ESC l	Clear line	Clears the entire line and resets the cursor to the start of that line.
ESC p/q	Reverse on/off	All text output is reversed. ie. black on white text becomes white on black after execution of this ESCape sequence.

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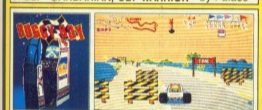

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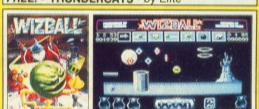

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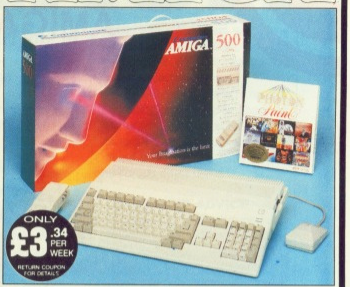

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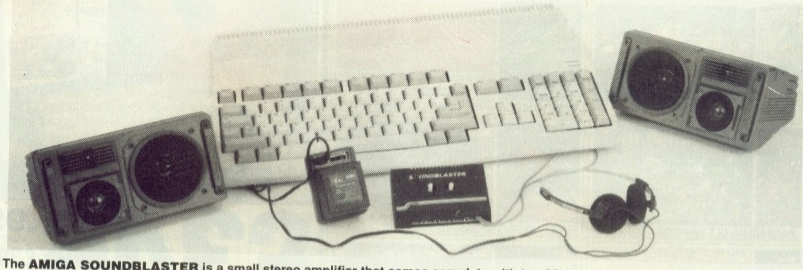

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WORKBENCH

This month, along with the usual helping of handy hints, we introduce a new reader technical help section. JASON HOLBORN sorts out your problems.

PROBLEMATIC PRINTER

I have an old Alphacom 32 printer (stop sniggering) and would like to know if it is possible to connect it to my Amiga 500 before I condemn it to the darker depths of my cupboard?

Is it possible to obtain a hardware device such as the Multiface ST for the Amiga?

Is there a difference between a sound digitiser and a sound sampler?

M.J.Pryor
Berkhamsted

Alphacom 32? If my memory serves me well, that particular printer was designed for use on the Spectrum. There really is no reason why any printer cannot be made to work with the ST or Amiga if you get the correct leads made up. Try your local computer store who may offer a lead-making service.

Romantic Robot, producers of the Multiface ST cartridge, are considering producing an Amiga version, but nothing is definite. Romantic can be contacted on 01 200 8870.

There is no difference between a sound sampler and a sound digitiser, both are exactly the same piece of equipment.

I THINK THEREFORE AMIGA

I am about to buy a computer for home use and the Amiga seems to be ideal for leisure, there is also plenty of business software available for it. However, at work I use an IBM PC to write special purpose programs using *dBASE 3+* and *DBXL*, and I would like to use my home machine to do the same.

There would seem to be two options available – use a PC emulator program such as *Transformer* (cheap) or fit an XT Bridgeboard (expensive). How well do these options perform? Assuming I fit an external 5.25-inch drive, is the disk format OK for transferring software between my PC and the Amiga?

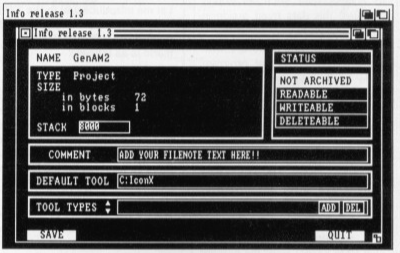
M.F.Green
Stevenage

The *Transformer* has now been discontinued. For your particular needs, the XT Bridgeboard is most certainly your best bet. The board is in fact a complete PC compatible on a card and comes as standard with a 5.25-inch PC drive. The bridgeboard is completely PC compatible and will quite happily run software such as *dBASE 3+*. You won't even need to transfer files to and from the Amiga because the included drive reads and writes PC format disks. For further info on the XT bridgeboard, check out our review in issue 9. The main problem is price – you can buy a real PC for the price of the Bridgeboard.

FLOPPY COPY

Since issue 1 I have been backing up my *Format* disks and have managed to store two *Format* disks on one blank disk, having first renamed all files to avoid confusion.

However, when I try to load a 'Read Me' file from my backup disk, a system request appears for the original disk to be inserted.



■ **The Workbench INFO window tells you all that you could possibly want to know about a file.**

Please tell me how I can get the 'Read-Me' file to access my backup disk.

Secondly, a 'friend' showed my how to protect a BASIC program from being listed. He resaved the program using the SAVE "FILENAME",P option. However, I can't find a way to reverse this, and (naughty naughty) have no backup of this program.

K. Thornton
Canvey Island, Essex

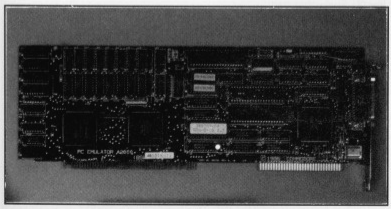
To make the Read Me files work from your backup, you will first have to copy the 'MORE' program from our cover disk to your backup. Secondly, you will have to change the tool name of the icon to MYDISK:MORE, where MYDISK is the name of your backup disk.

This is done on the Workbench. First of all, click one on the Read Me file's icon and then select 'INFO' from the Workbench menu. After a while, a window will pop up containing loads of really interesting info about that particular file. Somewhere within that window, there is a field entitled 'DEFAULT TOOL' that will contain something like CoverDisk#9:MORE. All you now have to do is to change this and then click on save.

Unfortunately, there is no way of getting your program back to its original, unprotected state. Always remember to keep backups of your own programs as well as *Format* cover disks!

SOUND ADVICE

My friend and I have recently purchased a 1 Mb RAM expansion for our Amiga 500s. We use Aegis



■ **The A2000 Bridgeboard which provides the Amiga with PC compatability and comes with a 5.25-inch internal drive as standard.**

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Send your worried words to: WORKBENCH HELPLINE, *ST Amiga Format*, 4 Queen Street, Bath BA1 1EJ.

Unfortunately we can only answer your queries in print. We can't enter into any correspondence even if you enclose an sae – so save yourself a stamp.

Sonix a lot and the main reason for upgrading was so that we could produce longer scores and use more instruments. However, we were writing a score when suddenly we were unable to load any more samples into memory. We checked how much free memory we had left and over 400k was free. Please could you help us.

Stuart Farrant
Leicester

All the graphics and sound that you see and hear on your Amiga are generated by the Amiga custom chips Agnes, Daphne and Paula. On the current release of these chips, they can only access the first 512K of RAM; any extra RAM is only used by the 68000. Therefore, if the custom chips are to access data such as sound samples, this data must reside in this first 512K block.

Most new programs are written so that the actual program code itself is loaded into expansion RAM (if it is present), leaving as much chip RAM free for data such as sound samples as is possible.

This chip RAM problem will hopefully be solved when Commodore finally get around to releasing the promised Enhanced Chip Set (ECS) upgrade. This new chip set promises to raise the chip RAM barrier from the present 512k level to a full 1 Mb. When they does arrive, you will then be able to load up to 1 Mb of samples.

GET YOUR MITTS ON THIRTY BIG ONES!

Surprisingly, the *Format* boffins are only human and therefore don't know absolutely everything that you could possibly know about the Amiga (you're surprised aren't you!). Therefore, this is where you lot come in. We want you to send us your handy tips and tricks on any aspect of the Amiga. We wants tips on absolutely anything and everything that an Amiga owner may find even remotely useful. We know you can come up with the goods.

"What do I get out of it?", I hear you ask. Well, how does instant worldwide fame and the possibility of picking up a rather attractive bundle of fivers sound to you? Interested? Send your words of wisdom to: WORKBENCH, *ST Amiga Format*, 4 Queen Street, Bath BA1 1EJ.

BEGINNERS' CORNER

In last month's tutorial on using AmigaDOS we finally took the plunge and started looking at a couple of the more common commands that you will encounter during your CLI-ing sessions. This month we'll continue where we left off with a look at a couple more AmigaDOS commands.

The first thing we must do before we start is to create a more useable environment for those of you with single drives. Enter the CLI and then type in the following commands:

```
COPY C:DIR|TYPE|DELETE|COPY RAM:
<Press RETURN>
PATH RAM: ADD      <Press RETURN>
```

MY TYPE OF COMMAND

Anyone who has any form of experience with any of the very early public domain disks on the Amiga will know how unfriendly they can often be. Probably the most annoying aspect arises when you try to view the contents of a Read Me file. Just how do you open a text file and read its contents? Let me introduce you to the TYPE command.

The TYPE command is used to display the contents of an ASCII text file. The format of the command is as follows:

```
TYPE <Filename>
```

Now let's put this theory into practice. The first thing we need before we can display a text file is to find a text file to display (seems logical!). Luckily, on every standard Workbench disk there is a little text file called a Mountlist, which is located in the DEVS directory of your boot disk. To display this file, you would enter the following:

```
TYPE SYS:DEVS/MOUNTLIST
<Press RETURN>
```

After a few seconds of disk access, the TYPE command will start to display the contents of the Mountlist. Unfortunately, unless you're a very quick reader, the text will fly off the screen before you get a chance to even read the first sentence. To pause the display, just press the space bar, and to start it again, press the DEL key.

DO YOU COPY?

All this moving around disks, displaying the contents of directories and files is all very nice, but sooner of later you may want to start moving files around. This then is where the COPY command comes in.

The COPY command, as you've probably already guessed, is a command that allows you to make a copy of a file (or a group of files) and have the results stored in the location of your choice. The format of the copy command is as follows:

```
COPY <Source Filename> <Destination
Filename>
```

The copy command is a fairly complex command that can be used in many different ways. For example, if you wanted to make a COPY of the Mountlist file and have it written to the RAM disk, you would enter the following:

```
COPY SYS:DEVS/MOUNTLIST RAM:
```

You may have noticed that we haven't actually told the COPY command what filename we would like the file to be stored under. Luckily, the command is fairly intelligent and if you don't specify a filename, it will use the same filename as the source file (in this example, MOUNTLIST). We could have entered RAM:MOUNTLIST as the destination filename and had the same effect.

If you wanted to, you could have the destination file stored under a different filename to that of the source. For example, if you wanted the destination file to be called 'FRED', you would enter:

```
COPY SYS:DEVS/MOUNTLIST RAM:FRED
```

BIN AND GONE

It's actually possible to get rid of files stored on disk. If you plan to do this from Workbench – the area containing click-down menus and icons – it's simply a matter of displaying the disk's contents and moving the file or files of your choice into the dustbin.

The first problem, of course, is producing a directory of what's on the disk – simple, just insert a disk into the drive and double click on the disk icon when it apears. A window will pop up displaying the disk's contents. You can now highlight the items you want to bin and drag them onto the trash icon (this icon should be inside the disk contents window). Easy, innit?. This operation doesn't erase files completely; it simply removes them from the root directory or drawer. To erase files completely – and free space on the disk – it is necessary to click on the Empty Trash item in the Disk menu (accessed by clicking and holding down the right mouse button). Make sure the trash icon is highlighted before you do this.

Because not all files are displayed when you elect to view files from Workbench, it is best to carry out file-trashing operations from the CLI. By entering the command DELETE followed by a filename it is possible to erase files. For instance,

```
DELETE anyfile
```

would remove *anyfile* from the current directory of the disk. It is possible to erase from other parts of the disk by adding a drive identifier and drawer information in front of the filename. Thus,

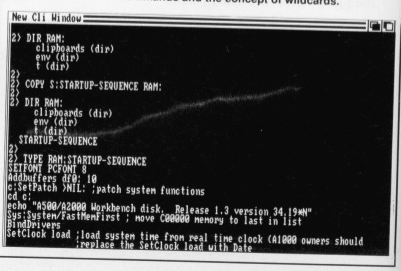
```
DELETE DF0:SYSTEM/anyfile
```

would erase *anyfile* from within the SYSTEM folder on drive DF0:.

HOMEWORK TIME AGAIN!

Thought you had got off easy this month, didn't you! No chance. Now that you are able to copy files, display their contents, and then delete them, why not try experimenting with these three commands? Next month we will introduce a couple of new CLI commands and the concept of wildcards.

■ No-one can argue that the Amiga's Command Line Interpreter (CLI) is easily grasped; aficionados swear by it simply because it offers so much control over the machine. The sort of control that just isn't available from Workbench. From Workbench you can copy, delete and run files; from the CLI you can do all that plus view all the files invisible to Workbench, add custom messages to disks and even recover damaged disks. Keep experimenting – and keep reading Workbench – and one day all will be clear.



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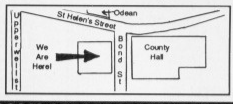

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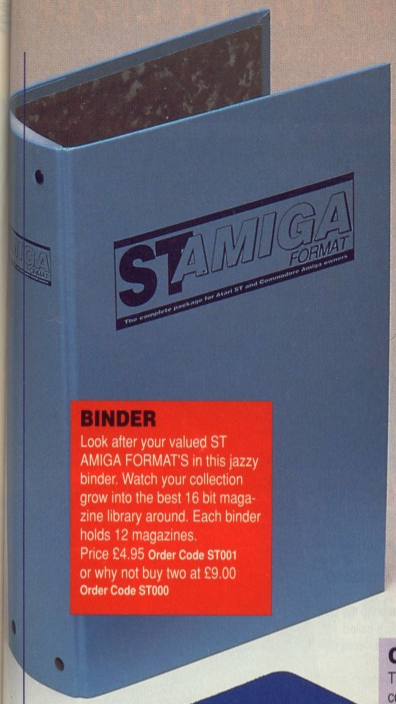

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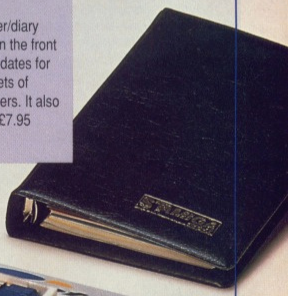

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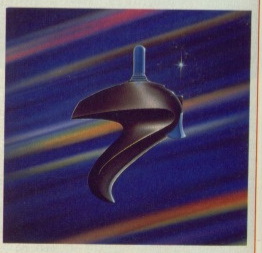

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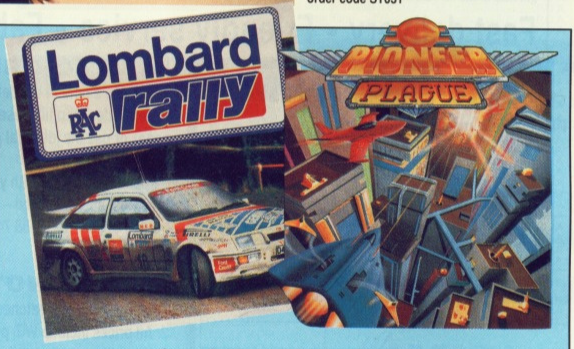

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There was a cut down version on the cover disk for you to get the feel of, but once you decide to get serious we know you'll want to get hold of the full version.

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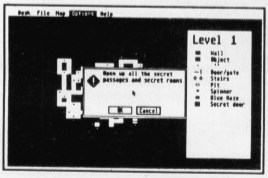

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SLAPPED WRISTS

I feel severely let down by the first installment of the 68000 programming series. You clearly place the quality of service to your readers a poor third to the mutual interests of yourselves and the software companies. We were promised a full development environment on the cover disk, when in fact we only got half that. You should NEVER separate a program from its documentation.

Now we have half an assembler, what are we supposed to do with it? Perhaps the article can tell us. Article? All we get here is a few pretty pictures and boxes, details of ONE assembly language instruction, and $2\frac{1}{2}$ columns-worth of things programmers will already know and beginners will see no use for.

'Why not start programming now?' suggests an attractive rectangular box. Does anyone in the *Format* office honestly believe we could start programming with this? Of course not. What we can do is pay £25 for the essential documentation of a now-superseded program, and buy lots more issues of *Format*.

It seems there are 72 basic instructions for the 68000; is this some cheap trick to keep us filling your pockets for the next six years?

Gareth Palmer,
Wanstead, London

We included Devpac on the disk so that readers could try out the example programs given in the assembler tutorial, and we included enough instructions for you to be able to do that. There didn't seem a lot of point in telling people about assembly programming if they couldn't try out their new found knowledge.

I'm sorry if you weren't impressed with the tutorial itself – we've tried to pitch it at a level the intelligent beginner can understand without having to re-invent the wheel each month.

STICKY PROBLEM

I have a small but annoying problem – labels. I do a lot of work on my ST and regularly save documents to disk and so need to change disk labels when wiping or copying items (like now I have saved this letter to disk). The problem is that disk labels are a b*****d to remove. The labels always come off in fifty zillion pieces and I end up scouring the disk with a big meat knife.

Please could you recommend a way to remove disk labels without removing a layer of plastic or ruining the disk.

Yours hopefully with a psychotic knife.

Nick Catchpole,
Silverdale, Lancs

I asked Jason our disk expert about this one, but unfortunately they don't let them have knives were he lives so he couldn't help.

NAME, RANK & SERIAL NUMBER

I read David Stevens' letter (March '89) with interest after having used the *Format 11* high capacity disk formatter (cover disk #6) extensively. I had had no problems of loss of data, so I put the matter to the back of my mind and kept using the (undeniably useful) formatter. It was when I was reading the excellent *Your Second Manual to the Atari ST* by Andreas Ramos that alarm bells went off. Chapter 4 is about disks, disk drives, TOS etc. Page 23 details problems of 'directory crashes' which were apparently commonplace in 1987 (I got an ST in 1988).

When the ST suspects you have swapped a disk (by monitoring the drive with an infrared light), it reads the disk's serial number. This should be a random number varying over a large range and is put on the disk at formatting time. If the number is different to that of the disk the ST last saw in the drive, the FAT sectors of the new disk are read into memory. Otherwise the information already held about open directories should still be valid, and the FAT is not read.

All this hinges on the fact that each of your floppy disks has a unique serial number. If not, you run the risk of your darling ST scrawling indiscriminately over your precious *1st Word Plus* files.

So I experimented. After formatting a few disks with *Format 11*, I checked their serial numbers

Right of Reply

In last month's Format Letters we printed a fair old slagging-off of Menace *on the ST. In the interests of fair, unbiased journalism, and 'cause we love a good scrap, here's what* Menace's *programmer has to say about it.....*

Dear Mr Stevens,

I agree with you wholeheartedly that the ST version of *Menace* is crap. What I advise you to do is sell your ST and buy an Amiga.

As for your comments about the graphics, apart from the score panel they are identical in every way to those on the Amiga.

If you met me and gave the *Menace* disks in any orifice you like (as long as it's not too painful!) all I would do is reformat them. It's a nasty thing to say about my own game, but true.

The reason for it being so bad is simply the ST's hardware. It has none of the features used in the Amiga version – no blitter, only 16 colours on screen from a palette of 512, and above all, no hardware scroling. The last is the most important since this is what takes the majority of the time on the ST. The game runs in just over two frames on a UK ST. Of this time more than one frame is devoted to scrolling the screen – if this was done in hardware it would take only about one or two scan lines to do this. The rest of the time is devoted to placing the sprites on the screen. This could be done a bit quicker with a blitter, but the main deficency is the hardware scrolling.

Also, on the Amiga version of *Menace*, the dual playfield mode of display is used, ie. there are two physical screens in memory, one overlaid on the other. It's hard to explain but it's a very useful technique if you want to scroll foregrounds every frame and everything else in less than a frame. This could not possibly be done on an ST with the humble 8MHz 68000 simply because it takes too much time to move that amount of memory.

If the hardware just can't cope, the game is bound to suffer – that's why my recommendation that you sell your ST and buy an Amiga is a good one. Please don't view me as an ST hater. I do enjoy using and programming the ST. I am going to do a new game for the ST in the distant future, but it won't be a game like *Blood Money* as I think it's almost impossibleto do a game like that in any reasonable amount of processor time.

Brian Watson
Programmer for DMA Design

I may be taking my life in my hands here, but does anyone out there diisagree with Brian?

with a boot sector examiner program. Sure enough, all the formatted disks had the same number: 11584801

Also, during my experiments a noticed how slowly these disks were read, probably due to the layout of the 11 sectors on the track. It seems to me that *Format 11* is not worth the worry and danger it causes.

My suspicions about all formatting utilities were now aroused, and next on my hit-list was *DOSACC* by L. Keeling (cover disk, #8). My fears were confirmed; all formatted disks had the serial number 65536.

CPanel (cover disk, March 89) redeemed your choice of PD software however, as the disks it formats all have different numbers! Also you can format 8, 9 or 10 sectors per track, 40, 80 or 82 tracks per disk, and in Fast, TOS or IBM Format.

Barry Prescott,
Hull, North Humberside

LETTER FROM AMERICA

It is refreshing to find a magazine that is not embroiled in the ST–Amiga war. I am tired of the constant arguments of my computer is better than your computer. I mean, it's like saying my .44 Magnum is bigger than your .357 Magnum. If you get hit by either gun both will leave a very large hole.

The basic question is 'What do you want to do with the computer?' Who cares which computer is more powerful? Are you that insecure that you've got to have bragging rights? Only those people who are insecure about their purchase or people who did not take the time to look at the strengths and weaknesses of the machines before they put down their money need worry.

Price is not the only consideration when buying a computer or any piece of equipment. The major consideration is what software can the computer run and does it meet my needs. The idea is to be an educated consumer. Not a person who is swayed by advertising hype or someone else's' opinion.

I therefore salute your magazine for a job well done. I buy your magazine through a local USA computer shop COMPUTER GAMES+ and while it is expensive the magazine is well worth the price when compared to USA computer magazines.

Willie C Burnside Jr,
Chicago, USA

ACE CARD

Only two measly pages of tips! Look at *ACE*! All those tips make your mouth water. And only eight reviews. I'm sure everybody's sick of all this techno-jargon.

Martin Grover,
Hailsham, East Sussex

We're not a games-only magazine, so of course we have less tips and reviews than ACE; why not get the best of both worlds and buy both?

GOING UP?

I am very interested in programming (and, of course, hacking) and have just saved up around £120, and wish to upgrade.

But that's where the problem arises. I just can't make my mind up what to buy. I have been thinking of another external disk drive, or an extra 512K expansion (although I will probably never get to use it), or perhaps even some good software.

You're the experts, what do you think should be the next upgrading step for me?

Martin Rubiera,
Ilford, Essex

Which upgrade to go for depends on what you want to use the machine for. Some games require a megabyte, but most run happily from a single drive A500, so if you want to play, buy some software. For programming however a hardware add on comes into its own. Two drives are a real boon, but a RAM drive could be just as effective if you upgraded the memory. Personally though, I just couldn't live with a single floppy drive.

IDLE WAFFLE

I am writing to you as: a) I can't be bothered to do my overdue GCSE coursework, b) there is nothing on TV, c) my faithful 16 bit beauty is having a nap, d) I feel like it, e) who's going to stop me?

Rude kids

Why is it that most computer shops employ rude, arrogant, ignorant morons who know nothing about computers?

I saw a typical example in a well known Tottenham Court Road store. I was standing in the shop waiting in a queue to be served. There were two spotty teenage so-called 'computer wizards' serving customers. One had a cigarette hanging out of his mouth reading what might well have been *The Beano*. A man in front of me was wanting to buy a Cambridge Z88 (why I don't know!). The conversation I heard was this:

MAN: Oh, that's such a small thing.

ASSISTANT: But it's got a lot of bits and bytes for memory.

MAN: Please, what's the difference between a bit and a byte, or what are they even? I've been to so many shops and no one seems to know.

ASSISTANT: Oh! Yeah, well it's like this, a bit is like a byte you know it's like saying what's the difference between the beat and the rhythm in music!

MAN: Oh, I see.

And all the time I was thinking what a nerd!

Angelo Ditommaso,
London

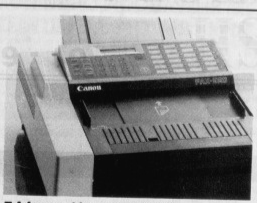
Hard fax

In my office we have a fax machine. It would seem to me that here we have a combination of a flat-bed scanner, a laser printer and a modem. Would it not be theoretically possible to do the following:

■ Produce DTP work at home on my ST and then send the lot down the BT line to the fax machine for a hard copy.

■ Scan an image on the fax machine, and send it to my ST?

I say theoretically, because I imagine that in addition to comms software, there would need to be a resident program that is capable of producing recognition signals, and of converting data into the appropriate form. Do the boffins know of anything commercially available, or in PD that can handle this?



■ **A fax machine or a scanner?**

If there is nothing currently available, it would seem to me that here is an area awaiting exploitation, as there are an awful lot of fax machines about.

Kevin A Moss,
Cardiff

I own an Atari 520ST computer and a Cannon FAX-520 facsimile machine. Is there any way to interface them so I could use the fax's scanner and phone modem with my computer? If not, can I just interface the scanner?

Thomas A Murray,
Banbury, Oxon

Would it be possible via the RS232 port and a modem to communicate with a fax machine? If so how? And what software would do this?

Simon David Greenway,
Stoke-on-Trent, Staffs

Interesting idea. Of course the printout from a fax is of fairly naff quality so I doubt it would be much use as an output device, but as a scanner it has much more potential. As I understand it faxes use a standard encoding system, so it should be possible. If anyone out there knows how it can be done, please do tell.

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How about a series on assembly programming? Also, what processor do PCs and Apple Macs have?

I would like to say thanks for such a thrashable mag, without which, 16-bit computing would be pointless.

Why are there no female ST users? And if there are I want their phone numbers!

Love and kisses,

Giles Chester,
Shepperton, Middlesex

What are you on? Whatever it is I want some. Anyway, you'll find the third episode of the assembly language soap opera on page 47. As to processors, the original PC used an Intel 8088, but nowadays you'll find 8086s, 80286s, 80386s and any day now 80486s tucked away in side them. The Mac uses the good old familiar 68000, just like your ST.

You're too young to have Miranda's phone number, you'll just have to play Teenage Queen *instead.*

PROTECTION RACKET

Speaking from experience, copy protection schemes implemented by most software companies are just not adequate to stop pirates. (When I say speaking form experience I don't mean I'm a pirate. I merely analyse the disks sectors out of pure curiosity.)

The one company who has done the most for copy protection is Microprose. Backup copies of their games are very easily made but the manual is needed to access the game using pictures associated with it for example *Silent Service* has destroyers to identify and *Stealth Fighter* (undoubtedly the best game I have ever played) uses aircraft: this doesn't detract from the game, in my opinion, but adds to the flavour of it. Pirates making copies wouldn't find it feasible to copy the entire manual now would they!

Paul Broadwith,
Glasgow, Scotland

Yep, totally agree.

PCW PROBLEMS

Currently using a 512K expanded Amstrad PCW8256 for wordprocessing, I intend to switch over to *Protext* 4 on the Amiga A500 (expanded to 1Mb) very shortly. However, all the files and information I now have stored on 24 three-inch compact diskettes. I would like to convert to the Amiga's 31/2-inch drive and in a format that *Protext* can understand.

Locoscript does have the facility to make an ASCII file of a particular document, though certain special characters (such as open and closed quotation marks) do not appear as they should on screen. Is there some way of connecting the two machines together in order that this ASCII file be transferred to the Amiga?

Marc Foreman,
Leeds, Yorks

It shouldn't be too difficult to do. You'll need a cable to link the serial ports of the two machines and some comms software to run at both ends. Make sure things like baud rate, parity, etc, are set the same on both machines and hit Send File at the Amstrad end.

Another possibility is using one of the many data transfer agencies, who'll do the job for you. One such is Transprint Communications on 0225 448218.

LOAD OF ZAK

I am writing to complain (yes, complain) about issue 10's Disk Extra section. It was an utter disgrace. You say that the demo of *Zak McKracken and the Alien Mindbenders* is playable. Absolute RUBBISH! All I was able to do was sit back and watch Zak take me on a tour of the game. Please explain your blunder! Was it meant to be some sort of April Fool joke?

Robert MacIndoe,
Swansea, West Glamorgan

As we explained last month, the playable Zak demo we were expecting to put on the disk turned up after we'd gone to press and was, as you all now know, not playable at all. Factors beyond our control, etc, etc.

SPEED STAKES

When discussing why the same game on the Amiga often runs more slowly than on the ST, people make much of the slightly lower clock frequency of the Amiga. (7.2MHz vs. 8MHz). Has no one considered that a more significant reason is that the Amiga has 32 colours and hence five bitplanes to manipulate, whereas the ST has only 16 colours and four bitplanes?

It is possible that if both machines only used four bitplanes, the custom graphics chips of the Amiga would more than make up for its slower clock rate. Has anyone ever performed any benchmarks?

Jane Sutcliffe,
Sandbach, Cheshire

No.

TEDIOUS TELLY

I was totally disappointed by the Software Show on the BBC.

At the start I thought it would be about games and all the things you cover but no. They decided to be totally naff and review education software and DTP with a spot of bird watching. I think if this is the way the BBC want to show a computer show I'll stick to reading mags like yours.

Robert Brand,
London

The BBC have consistently failed to produce a show which appeals to the many thousands of computer users across the country. But they do have their own computers (the BBC micro, Master 128 and Archimedes 300 series) to look after, and indeed their own computer mag (BBC Acorn User), all of which are heavily biased towards education – hence the bias in their programmes.

Superheroes, Inc.

by Sarkar

PARIS, FRANCE...
GO, BUDDY!
ZUT ALORS!
SACRE BLEU!
MON DIEU!
I CAN HOLD 'EM OFF...
QUICK! THE LEADER BEFORE HE ESCAPES!
EAT SWORD, BOZO! I WANT YEE BOSS, THE LEADER OF EAROSE*!
AND I'LL BET THAT'S HIM IN THE RAINCOAT!
BAM!
*EXTREMISTES POUR L'OPPRESSER AVEC LES SOFTWARES EROTIQUES
YA SEEN BRAIN-WASHING FRENCH PROGRAMMERS TO WRITE...
PORNO-GRAPHIC SOFTWARE, EEEEEH!
KIDS ARE BEING CORRUPTED, AND...
HUBBA
EES ZAT AN ATARI FOLIO IN YOU POCKET, OR ARE YOU PLEASE FOR SEEING ME?
EAT ZE DEATH, SUCKERE...
BAM!
YOU SCHMUCK. AH, SHADDAP. LET'S CHECK OUT THE SOFTWARE CACHE...
YEAH! I FOUND EMMANUELLE! PHAR...
AHEM. WELL, I'VE LEERED OVER... I MEAN WITNESSED ALL THE SMUTTY SOFTWARE I NEED TO. LET'S DESTROY IT ALL NOW...
SOFTWARE VAULT
NO! WAIT! NOT YET!
I CAN'T LET TEENAGE QUEEN TAKE HER SOCKS OFF. DAMMIT..!

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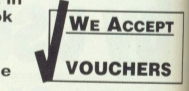

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ST Switching unit between Mono and Colour Monitors	£19.50
ST 14 pin din - 14 pin din disk drive cable 1m - £8.99 2m - £9.99	
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Scart Extension lead 2m - all pins connected ...£8.99 In Kit form	£6.99
34w IDC plug to 34w IDC socket 1.5m	£14.99
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In kit form (with diagram)	£6.99
AMIGA 23w D Socket to 9w D plug (NEC multisync Analogue RGB)	£9.99
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AMIGA 23w D Socket to 9w D socket (Phillips 8873 TTL RGB T)	£9.99
In Kit form (with diagram)	£6.99

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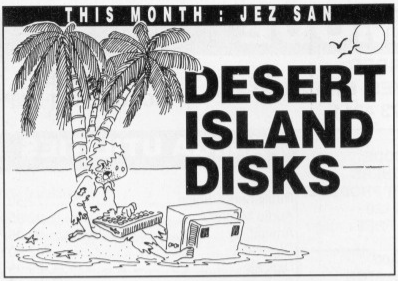

You're deposited on a sun-drenched island with only your ST or Amiga (both if you happen to have the two), 10 items of software and one computer-related luxury item. So what do you take? You could be there a long time... and the possibilities are endless.

But that's not your problem this time. Busking in the baking desert island sun this month is Jez San and his Argonauts. The Argonaut team are responsible for the hugely successful *Starglider* and *Starglider II*. Here, in no particular order, is what the Argonaut crew would take and why:

■ **Speedball**, Mirrorsoft
The best game you can buy for two players. Really addictive. We play it when we should be working.

■ **Virus**, Firebird
Nice patchworks – but they don't rotate. Really, it's a programmer's game because only programmers will respect the algorithms involved.

■ **Devpac**, HiSoft
Most of HiSoft's stuff is very useful. We use HiSoft BASIC and *Devpac* all the time for development.

■ **Powerdrome**, Electronic Arts
Great game. The ST version is too hard to fly, but the Amiga version is just perfect.

■ **Chuck Yega's Advanced Flight Trainer**, Electronic Arts
Nice flight simulator which has some really neat features.

■ **Starglider II**, Argonaut
Fastest 3D game with complex scenery. Mind you, it's not as fast as *Hawk*.

■ **Populous**, Electronic Arts
The most original concept for a long time. What a great game!

■ **DPaint III**, Electronic Arts
Superb art package – all our still art is drawn using it.

■ **Buggy Boy**, Elite
Well implemented coin-op conversion. The way the buggy bobs is wondrous.

■ **Argasm**, Work it out!
Fastest assembler in the west; up to one million lines assembled in a minute on a standard Amiga (that's enough hype – Ed).

Domino's Pizza Delivery wins the Argonauts' seal of approval; it's their choice of luxury item. "A well used utility that's extensively tested by in-house staff," reckons Jez.

The Argonauts also have a top 10 worst software titles – but we couldn't publish that. Suffice to say that **Afterburner** and Chris' (one of the team) **microwave TV dinners** were somewhere in the list.

■ **Jez San of Argonaut contemplating a few years of solitary on a desert island with only a computer and a pizza for company.**

ADVERTISERS INDEX

16 Bit Centre 86
Adventures 28
Arran 6
BBD 73
CDS 25
Castle Software 68-69
Cavendish Distributors 113
Club 68000 Ltd 20-21
Computer Connections 121
The Computer Shop 22
CopyComm Software 56
C/ST 39
Database Exhibitions 18-41
Dataplex 90
Dataworld 54
Datel Electronics 3-IFC
Digicom 59
Electronic Arts 15
Equinox Business Systems 60
Evesham Micros 55
Futureplace Computers 51
Goldmark Systems 28
George Thompson Services 32
Home Based Business 28
Homesoft UK 114
Intermediates 97
Ladbroke Computing 64-65
MJC Supplies 49
Matrix Software 73
Mirrorsoft 27
Media Gold 108
Megaland 93
Merrymode 121
Micronet 53
Miditech 46
Photofile 37
Postronix Ltd 16-17
Quadsoft 46
Romantic Robot 90
SCC 37-39
SDC Software 117
ST UK/Purple PD 28
Sabre Sixteen 83
Silicon Dreams 77
Softsellers 107
Softville PD Service 54
Silica Shop 81-103
Siren Software 104
Software Express 114
Software Club International 70
Software Super Stores Ltd 83
Tonic Audio 37
Thalamus Hawkeye 11
Treble H Computing 101
Trilogic 46
Tynesoft ..... IBC
Worldwide 108

NEXT MONTH

The July first anniversary issue of *Format* will be jumping onto a newsagent's shelves near you on

THURSDAY JUNE 15

Inside the bulging birthday issue you'll find these goodies:

■

COMPETITIONS
Megabucks-worth of hardware and software to be won. Already lined up is a fabulous Thunderblade arcade machine, sexy ST and Amiga hard drives, a fantasy role-playing holiday, stacks of the best software, T-shirts... the list is endless.

■

PIRATES
Are they saints or sinners? *Format* investigates piracy and hacking, what pirate-busters FAST can do to counter the problem, and what damage casual copying does to the software industry.

■

BOOK LOOK
Libraries of the future might not exist as you know them today; rather than pick up a book you might pick up a slither of silicon or a CD containing the entire works of Barbara Cartland (what a dreadful thought – Ed), take it home and produce a hardcopy from your machine.

■

HARD BARGAINS
Suddenly everyone is launching low-cost hard disks. Your guide to what's available and why a hard drive might be a good investment.

■

GAMES SHOWDOWN
Stacks of power-packed games for your pleasure. There's Skyfox II, Bloodwych, Forgotten Worlds, Total Eclipse, Soccer, Astaroth and Wicked to look forward to.

Because the ST and Amiga world is so vibrant, we can't guarantee that all of this will end up in next month's pages – but we will guarantee that if anything gets replaced it will only be by an even better feature.

PERSONAL NIGHTMARE

There's something very strange going on. It's as if you are living through your worst nightmare and unable to wake up. Won't anyone let you in on the terrible secret that haunts your waking moments.

Personal Nightmare is the new brain child of HORROR SOFT. A new kind of icon-driven, animated game that has been written using the new especially developed Agos language.

Personal Nightmare is highly original using all the features of the 16-bit micro. The superb, fully animated graphics, backed by incredible sound effects come together with a highly sophisticated user interface to give total involvement of a new dimension.

Personal Nightmare will introduce you to numerous characters including:

The Landlord of the Dog and Duck
Jimmy Blandford and his attractive wife Susan
Alice Greenwood
The local village policeman
and a host of other inhabitants who will share in your *Personal Nightmare*.

Available on AMIGA, ST & PC

Unit 3, Addison Industrial Estate, Blaydon,
Tyne & Wear NE21 4TE. Tel (091) 414 4611

As the people of the Bloodwych awake to a new dawn, they find a stranger in their midst – from one of many races he has come. His task; to halt the demon that lies dormant within the Castle of the Bloodwych.

Unification of the Crystals of Sanguis will secure the Behemoth in his lair for all eternity. Should they remain separate, then he shall rise to bring darkness into the world.

This unique role-playing fantasy game allows greater interaction with the environment than has ever been seen before. Argue, barter, negotiate – even lie through your teeth! The fully implemented personalities of all the characters in Bloodwych allows a rich style of role-playing that has only been dreamt of.

With one or two player simultaneous mode, this is the game that you've been waiting for. Bloodwych for those that dare!

ARGUE!
BARTER!
LIE THROUGH YOUR TEETH!!!

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Commodore 64 (tape)	£9.99
Commodore 64 (disc)	£12.99

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